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5.1 AIR QUALITY

This section addresses the potential air quality impacts resulting from the construction and operation of the Salton Sea Unit 6 Project (SSU6 Project) and mitigation measures that keep impacts below thresholds of significance. The analysis was conducted according to California Energy Commission (CEC) power plant siting requirements for a Commission Decision and according to Imperial County Air Pollution Control District (APCD) permitting requirements for a Determination of Compliance/Authority to Construct (DOC). The project will use established geothermal technology to generate electricity in a manner that will minimize the emissions of pollutants and their potential effects on ambient air quality. Other environmental benefits include:

- Generation of electricity with renewable resources
- Minimal generation of criteria pollutants during operation of the power plant
- Best available control technology to minimize the emissions of hydrogen sulfide, benzene, arsine and mercury
- Offset of hydrogen sulfide emissions with reductions from existing geothermal power plant emissions
- Offset of PM_{10} emissions with emissions derived from the APCD's approved offset list
- Overall net air quality benefit when using the specified offsets.

Section 5.1.1 describes the local environment surrounding the SSU6 Project. A brief review of the geography and topography of the site and surrounding area is provided along with a more detailed description of the climate and meteorology of the area. This section also provides an overview of the ambient air quality standards, and discusses the criteria pollutants and existing air quality near the proposed project. Section 5.1.2 reviews the environmental air quality consequences of the SSU6 Project. This section describes the approach to estimating the facility emissions and evaluates their impacts. The methodology used in modeling the impacts is described in detail. Section 5.1.3 presents the cumulative impact analysis. Section 5.1.4 provides the proposed mitigation measures. Section 5.1.5 lists all of the applicable laws, ordinances, regulations and standards that apply to the project, the agency contacts involved in the air quality assessment and the permits required along with the schedule. Section 5.1.6 provides a list of references used in the air quality assessment.

Some air quality data are presented in other sections of the AFC, including an evaluation of toxic or hazardous air pollutants (see Section 5.15, *Public Health*) and information relating to the engineering aspects of the project (see Section 3.0, *Facility Description and Location*). Tables and figures are found at the end of this section.

5.1.1 Affected Environment

The SSU6 Project consists of the well field, which includes production and injection pads and wells, the geothermal power plant, which includes the resource production facility (RPF) and the power generation facility (PGF), and the transmission line, located near the southern edge of the Salton Sea. This region of the Imperial Valley is used mostly for wildlife habitat, agricultural uses, and geothermal power production. Of all the project components and activities, the release of noncondensible gases to the atmosphere appears to have the greatest potential to significantly impact air quality. The emissions from the Project will be mitigated with control technologies and/or design and operational aspects. Additionally, the emissions of hydrogen sulfide (H_2S) (quantifiable, verifiable reductions from existing facilities) and particulate matter with aerodynamic diameter less than 10 microns (PM_{10}) from the SSU6 Project will be offset.

5.1.1.1 Geography and Topography

The project area is situated at the northern end of the Imperial Valley, a broad flat depression, flanked on the east and west by mountains. In the center of the depression lies the Salton Sea. The proposed project site will be located just south of the Salton Sea and near Obsidian Butte.

The relatively featureless terrain is interrupted by five small volcanic domes. Obsidian Butte and Red Hill are the largest of the domes as shown in Figure 5.1-1. The elevation and size of Obsidian Butte has been diminished in recent years by the surface mining of rock for the Salton Sea dike system. The project site is level at an elevation of approximately 230 feet below sea level. The surrounding terrain rises slightly as you move away from the project site. The Salton Sea is at an approximate elevation of 228 feet below sea level. The mountains lie approximately 20 miles to the east and 24 miles to the west. The nearest residence (the residence of the Wildlife Refuge Headquarters staff) is about 0.7 miles away, toward the northeast. The next nearest residence (a farm house) is about 2.0 miles to the east.

5.1.1.2 Climate and Meteorology

Imperial County is classified as having a desert climate which is characterized by low precipitation, hot summers, mild winters, low humidity and strong temperature inversions. The area's climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high pressure center over this area. The high pressure ridge blocks out most mid-latitude storms, except in winter when the high is weakest and the farthest south. The coastal mountains on the western edge of the Imperial Valley also have a major influence on climatic conditions by blocking the cool, damp marine air found in the California coastal environs. The flat terrain of the valley floor in the Salton Sea area and the strong temperature differentials created by intense solar heating produce moderate winds and deep thermal convection currents. The combination of subsiding air, protective mountains, and distance from the ocean all combine to severely limit precipitation. The valley area experiences surface inversions almost every day of the year. These inversions are usually broken by solar heating.

Strong, persistent subsidence inversions, caused by the presence of a Pacific high pressure system, can persist for one or more days, causing air stagnation conditions.

Temperature and precipitation data from the nearest representative local cooperative station, Brawley 2 SW, over a 30 year record, 1961-1990, are used to define climatic normal, means and extremes. The hottest month, July, has an average maximum temperature of 106.5° F, an average minimum temperature of 74.4° F, and an average mean temperature of 90.5° F. The coldest month, January, has an average maximum temperature of 69.3° F, average minimum temperature of 35.7° F, and average mean temperature of 54.0° F. Annual average rainfall is 3.05 inches. The wettest month is December, averaging 0.41 inches; the driest month, June, averages 0.01 inches. Rainfall is highly variable with precipitation from a single heavy storm potentially exceeding the entire annual total rainfall during a drought year. Humidity levels have not been recorded at Brawley 2 SW. High winds are occasionally experienced in the Imperial Valley region. Monthly average wind speeds in the region range from 6.6 mph in October to 9.5 mph in July. Annually, winds average 7.8 mph. Winds in the valley are primarily from west to east throughout the year, but have a secondary southeast component in the fall. Solar insolation again based on regional data suggests that 90 percent of possible sunshine occurs in the region. The cloudiest periods occur in winter while the sunniest periods are in the summer.

Wind movements in the project area are important to several engineering decisions on plant design including the distribution of air pollutant emissions from the proposed facility. The wind distribution for both speed and direction components are graphically represented in wind roses. The wind roses based on Imperial County Airport data for the period 1995 – 1999 are presented in Appendix G.1. Figure 5.1-2 presents the wind rose for the years 1995 – 1999 combined and wind roses in Appendix G.1 present the combined quarterly wind roses, individually. In general, the winds have a predominately west to southwesterly component with the period average wind speed of 3.69 meters per second or 5.23 mph. There are also a significant percentage of calm winds (18.5 percent) when there is no measurable wind speed or wind direction. Individual years have shown similar patterns as shown in the years 1995 – 1999 combined wind rose for both the individual annual cases as well as for the individual quarters. These data will be further discussed in the modeling analysis.

5.1.1.3 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (U.S. EPA) has established national ambient air quality standards (federal standards) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), PM_{10}, particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead. Areas with air pollution levels above these standards can be considered "nonattainment areas" subject to planning and pollution control requirements that are more stringent than standard requirements.

Additionally, the California Air Resources Board (CARB) has established standards (California standards) for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

Both California and federal air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, 1 month or annual). For some pollutants there is more than one air quality standard, reflecting both short-term and long-term effects. Table 5.1-1 presents the federal standards and California standards for selected pollutants. The California standards are generally set at concentrations much lower than the federal standards and in some cases have shorter averaging periods.

U.S. EPA's new federal standards for ozone and fine particulate matter went into effect on September 16, 1997. For ozone, the previous one-hour standard of 0.12 parts per million (ppm) was replaced by an eight-hour average standard at a level of 0.08 ppm. Compliance with this standard will be based on the three-year average of the annual 4th-highest daily maximum eight-hour average concentration measured at each monitor within an area.

The federal standards for particulates were revised in several respects. First, compliance with the current 24-hour PM_{10} standard will now be based on the 99th percentile of 24-hour concentrations at each monitor within an area. Two new $PM_{2.5}$ standards were added: a standard of 15 micrograms per cubic meter ($\mu g/m^3$), based on the three-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 $\mu g/m^3$, based on the three-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area. Recent court decisions have delayed the implementation of these new standards; however as of March 26, 2002, U.S. EPA is moving forward with implementation of the new standards. Additionally, CARB is in the initial public review process of amending the particulate matter air quality standards. CARB is proposing the following changes:

- Lower the annual average PM_{10} level to 20 $\mu g/m^3$ (currently 30 $\mu g/m^3$).
- Establish an annual average $PM_{2.5}$ standard of 12 $\mu g/m^3$.
- Establish a 24 hour $PM_{2.5}$ standard of 25 $\mu g/m^3$.

5.1.1.4 Existing Air Quality

All ambient air quality data presented in this section were published by the CARB on the ADAM website and by U.S. EPA on the AIRS data website. Ambient air concentrations of ozone, NO_2, SO_2, CO, PM_{10} and airborne lead were recorded at monitoring stations throughout Imperial County. The region surrounding the proposed project site is a remote, desert-like environment with a very sparse population. Each monitoring station in the region, in general, only records one or two criteria pollutants. Therefore, existing air quality data had to be collected from a multitude of monitoring stations. In such remote, rural areas pollutant concentrations are not expected to vary significantly from one location to the next because the sources are few and broadly distributed.

The nearest monitoring station is Niland, which measures ozone and PM_{10}. This station is 5.6 miles northeast of the proposed project site. Ozone and PM_{10} are also monitored at stations in Westmorland, 9 miles from the project site, Brawley, 13 miles from the project site, El Centro, 26 miles from the project site, and at two monitoring stations in Calexico (East and Ethel Street). CO concentrations are also monitored at the El Centro monitoring station and at the two monitoring stations in Calexico. NO_2, SO_2 and lead concentrations are also recorded in Calexico just north of the U.S./Mexico border. NO_2 and SO_2 are both monitored at the Calexico-East and Calexico-Ethel Street monitoring stations and lead is monitored at the Calexico-Ethel Street monitoring station. The Calexico stations are 36 and 35 miles from the site, respectively. The locations of the monitoring stations, in general, were positioned to represent area-wide ambient conditions rather than the localized impacts of any particular facility. The locations of the mentioned ambient air quality monitoring stations relative to the proposed project site are illustrated in Figure 5.1-3.

5.1.1.4.1 Ozone

In the atmosphere, ozone is an end product of complex reactions between volatile organic compounds (VOC) and oxides of nitrogen (NO_X) in the presence of intense ultraviolet radiation. VOC and NO_X emissions from millions of vehicles and stationary sources, in conjunction with daytime wind flow patterns, mountain barriers, a persistent temperature inversion and intense sunlight, result in high ozone concentrations in Imperial County. For state and federal air quality planning purposes, Imperial County is classified as a nonattainment area for ozone.

Tables 5.1-2 through 5.1-4 show the annual maximum ozone levels for 1-hour and 8-hour averaging periods recorded at the three nearest monitoring stations from 1991 through 1999 (where data are available), as well as the number of days in which the California standards and federal standards were exceeded. The data shows that the 1-hour average was in excess of the California standard (0.09 ppm) at least once a year at all the stations except in 1999 for the Niland station. The Niland monitoring station, only 5.6 miles from the project site, measures the most representative existing ambient air quality data for the proposed project site because of its similar desert-like characteristics and proximity to the proposed project site. At Niland, the recorded ozone concentrations were in exceedance of the 1-hour California standard once in 1997, five times in 1998 and did not exceed the California standard in 1999. The 1-hour concentrations were never in exceedance of the federal standard. The 8-hour average concentrations on the other-hand were in exceedance of the federal standard only in 1998 on four different days. Concentrations recorded at Westmorland and El Centro are presented in Tables 5.1-3 and 5.1-4, respectively. Westmorland has more numerous exceedances of the California and federal standards. El Centro having the longest data record suggests that ozone levels may have peaked in the mid 1990's and are now tending toward lower concentrations.

5.1.1.4.2 Nitrogen Dioxide

Atmospheric nitrogen dioxide is formed primarily from reactions between nitric oxide (NO) and oxygen or ozone. NO is formed during high temperature combustion processes, when the nitrogen and oxygen in the combustion zone combine. Although NO is much less harmful than NO_2, it normally converts to NO_2 in the atmosphere within a matter of hours, or even minutes under certain circumstances. For state and federal air quality planning purposes, Imperial County is classified as being in attainment for NO_2.

Table 5.1-5 shows the maximum 1-hour and annual average NO_2 levels recorded at Calexico - East between 1996 and 2000. This monitoring station is the closest to the project site with NO_2 air quality data. During the period shown, there has not been a single exceedance of the state 1-hour standard (0.25 ppm) or the federal annual standard (0.053 ppm). This station is near the Calexico - East Port of Entry, which had an estimated 2.4 million vehicle crossings in 1999 including trucks. The only other station recording nitrogen dioxide concentrations in Imperial County is Calexico - Ethel Street; however, this station's data are not likely to be representative of the project site concentrations because it is near the Calexico Port of Entry, which had an estimated 6.8 million vehicle crossings in 1999. Table 5.1-6 presents the data recorded at Calexico - Ethel Street.

There are no other stations in Imperial County that measure NO_2. CE Obsidian Energy LLC (Applicant) proposes to use the Calexico - East data as a conservative case for the project site conditions. This station is considered conservative because of the difference in nearby vehicle traffic and because it can be impacted by the urban and industrial emissions of Mexicali, a city of over 600,000 inhabitants.

5.1.1.4.3 Carbon Monoxide

Carbon monoxide is a product of incomplete combustion and common sources are motor vehicles and other non-stationary sources. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also measurably contribute to high ambient levels of CO, according to the CARB 2000 emissions inventory (www.arb.ca.gov/emisinv/eib.htm). Industrial sources typically contribute less than 10 percent of ambient CO levels. Peak CO levels occur typically during winter months because of a combination of higher emission rates and stagnant weather conditions. For air quality planning purposes, Imperial County is classified as being in attainment/unclassified for both national and state ambient standards for carbon monoxide.

Table 5.1-7 shows the highest 1-hour and 8-hour CO concentrations recorded at El Centro from 1996 through 1998, along with the number of days exceeding either the California standard or federal standard. This monitoring station is the closest to the project site with CO existing air quality data. The values recorded are relatively low, and indicate that no California or federal standards were exceeded for the three years of available data. The low levels tend to reflect the low level of motor vehicle activity in the area. The other monitoring sites in the region with carbon monoxide data (Calexico - East and Calexico - Ethel Street) are influenced by motor vehicle activity and are not considered representative of project site conditions. Table 5.1-8 presents the data recorded at Calexico - East, and Table 5.1-9 presents the data recorded at Calexico - Ethel Street.

The Applicant proposes to use the El Centro data as a conservative case for the project site conditions. As noted earlier, this station is considered conservative because of the difference in nearby traffic and the station's proximity to a major Mexican urban center.

5.1.1.4.4 Sulfur Dioxide

Sulfur dioxide is produced when any sulfur-containing fuel is burned. The elemental or organic sulfurs in the fuel are combined with oxygen to produce SO_2. It is also emitted by chemical plants that treat or refine sulfur (S) or sulfur-containing chemicals. Natural gas contains a minimal amount of sulfur, while fuel oils can contain much larger amounts. Because of the complexity of the chemical reactions that convert SO_2 to other compounds (such as sulfates), peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel use characteristics, weather conditions and topography. For air quality planning purposes, Imperial County is classified as being in attainment for all federal and state SO_2 standards.

Table 5.1-10 presents the maximum concentrations recorded at the Calexico - East monitoring station and also provides the number of days the ambient air quality was in exceedance of the California or federal standards. This monitoring station is the closest to the project site with representative SO_2 existing air quality data. The available data from 1996 through 1998 shows that the SO_2 concentrations recorded are well below all state and federal standards for all averaging periods. This station is influenced by commercial and industrial activities near Calexico, and therefore, the values presented are likely to be conservative estimates of the background levels near the proposed project site. Another monitoring station measuring SO_2 is Calexico - Ethel Street.

Data collect at this station is presented in Table 5.1-11. This station's data are not likely to be representative of the project site concentrations because of the urban and commercial setting surrounding the station in downtown Calexico.

No other ambient air quality monitoring stations in the County record SO_2 concentrations. The Applicant proposes to use the Calexico - East data as a conservative case for the project site conditions. As noted earlier, this station is considered conservative because of the difference in nearby traffic and the station's proximity to a major Mexican urban center.

5.1.1.4.5 Particulate Matter

Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources (usually carbon particles); and organic, sulfate and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides and nitrogen oxides. Particulates, for regulatory purposes, have been regulated based on particle size. In 1984, CARB adopted standards for fine particulates (PM_{10}) and phased out the total suspended particulate (TSP) standards that had previously been in effect. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of inhalable particulates related to human health. In 1987, U.S. EPA also replaced national TSP standards with PM_{10} standards. Officially, for air quality planning purposes, Imperial County is classified as in nonattainment for both the federal and California PM_{10} standards. Initially California was to have attained the PM_{10} standards in Imperial County by December 31, 1994. Not meeting the standards by that date would have forced the U.S. EPA to reclassify the area as a severe non-attainment area, except that California demonstrated to the U.S. EPA that the standards would have been met except for emissions emanating from outside the U.S. Currently, the area is officially still a moderate non-attainment area even with the U.S. EPA's finding of attainment. For the U.S. EPA to reclassify Imperial County as being in attainment, Imperial County must request reclassification to attainment.

Tables 5.1-12 through 5.1-14 provide the maximum 24-hour concentrations, the annual arithmetic mean concentrations, annual geometric mean concentrations and estimated number of days of exceedances for PM_{10} from 1991 through 2000 (where data are available). Data from the three nearest monitoring stations to the project site, Niland, Westmorland and Brawley are presented. The Niland data best represents the existing ambient air quality at the proposed project site because of its proximity to the site and similar sparsely inhabited, desert-like characteristics.

Table 5.1-12 shows PM_{10} concentrations recorded at Niland consistently exceed the 24-hour California standard. The federal 24-hour standard of 150 $\mu g/m^3$ was exceeded for only two of the five years of available data. The ambient levels were below the federal annual PM_{10} standard of 50 $\mu g/m^3$ for the available monitored data. The data at Westmorland and Brawley also show PM_{10} concentrations that consistently exceed the 24-hour California standard. The federal standard was also exceeded based on data recorded at these two stations. Exceedances were seen in three of the seven years of recorded data at Westmorland and in five of the ten years of recorded data at Brawley. Unlike the data recorded at Niland, the federal annual standard of 50 $\mu g/m^3$ was exceeded at both Westmorland and Brawley. Exceedances of the annual federal standard were seen in two of the seven years of recorded data at Westmorland and in five of the ten years of recorded data at Brawley. The California annual standard of 30 $\mu g/m^3$ was exceeded for every year of available data at Niland, Westmorland and Brawley.

Currently, there are no California or federal standards for $PM_{2.5}$. U.S. EPA had proposed both a 24-hour and an annual federal standard in 1997, but a federal court ruling blocked implementation of these standards. The court's decision to reconsider implementation of the standards is still pending. The nearest $PM_{2.5}$ monitoring station to the project site is in the city of San Diego. Because there is insufficient monitoring data available near the proposed project site and no current standards exist, $PM_{2.5}$ data were not analyzed.

5.1.1.4.6 Airborne Lead

Most lead in the air results from the combustion of fuels that contain lead. Historically, motor vehicle gasoline contained relatively large amounts of lead compounds. The lead was used as octane-rating improvers with the result that ambient lead levels were relatively high. Beginning with the 1975 model year, manufacturers began to equip new automobiles with exhaust catalysts; however, these catalysts are poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing fraction of new vehicles, and the phase-out of leaded gasoline began. Consequently, ambient lead levels decreased dramatically in California and the rest of the nation. The entire state, including Imperial County is now classified as in attainment with state and federal lead standards.

Table 5.1-15 presents recorded maximum 24-hour and quarterly averages for lead at the Calexico-Ethel monitoring station from 1996 through 2001. This monitoring station is the closest to the project site with representative airborne lead air quality data. The table shows a steady decreasing trend of ambient lead levels from 1996 to the present. Levels currently are well below the 30 day state standard of 1.5 $\mu g/m^3$ and the calendar quarterly federal standard of 1.5 $\mu g/m^3$. Levels near the proposed site are likely to be lower than those presented here because of the lack of motor vehicle traffic at the site as compared to the area surrounding the Calexico - Ethel Street station site. No other lead monitoring is performed in the County, and therefore, the Calexico - Ethel Street data are proposed as a conservative estimate of the region's background lead levels. As noted earlier, this station is considered conservative because of the difference in nearby traffic and the station's proximity to a major Mexican urban center.

5.1.1.4.7 Hydrogen Sulfide

The Niland station was originally established to monitor the ambient levels of H_2S in the area of the Salton Sea Known Geothermal Area. The H_2S monitor has had extensive operating and quality control issues, such that H_2S monitoring had to be discontinued. Thus, the area is designated as an attainment/unclassified area. As noted above, California has promulgated an H_2S ambient standard of 30 parts per billion (ppb) (42 $\mu g/m^3$). The U.S. EPA has not established a standard for H_2S.

The APCD has recommended a background H_2S level of 24.6 $\mu g/m^3$ for the region based on their assessment of the area.

5.1.1.5 Proposed Background Air Quality Data

The existing ambient air quality in the site area has been defined based on recorded concentrations in the region. The maximum values from representative monitoring stations over the most recent three years of available data have been selected to represent the background ambient air quality for the proposed project site. Table 5.1-16 summarizes the background concentrations for each pollutant that will be used in the air quality impact analysis for the proposed project.

The current air quality status of Imperial County for both California and federal standards is summarized in Table 5.1-17.

5.1.2 Environmental Consequences

Appendix G of the California Environmental Quality Act identifies the following criteria for determining significance:

- Does the project conflict with or obstruct implementation of the applicable Air Quality Attainment Plan?
- Does the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?
- Does the project result in a net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?
- Does the project expose sensitive receptors to substantial pollutant concentrations?
- Does the project create objectionable odors affecting a substantial number of people?

5.1.2.1 Overview of the Analytical Approach to Estimating Facility Impacts

The SSU6 Project consists of three major components affecting air quality.

1. Well field, including well pads, production wells, injection wells and associated pipelines
2. Power plant
3. Transmission line

Further, the well field and power plant emissions have been divided into three areas:

1. Construction
2. Operations, and
3. Temporary emissions.

The construction emissions are from those activities associated with building the entire facility, including the commissioning period. The operations emissions are based on peak emissions associated with maximum design flow rates of brine through the facility. The temporary emissions are those associated with anticipated intermittent emissions from devices or processes that may occur, such as reworking wells and steam being sent to the steam vent tanks during an upset condition, following the commencement of power plant operations.

Well Field

The Applicant is proposing the development of 10 well pads. Five of the well pads will be used for production and will contain 10 production wells. These pads are north, south, and west of the power plant site. Seven injection wells will be located on three pads to the southeast and east of the site. Two injection wells (plant wells) will be located in the power plant area on two pads previously developed as exploration wells. Pad and pipeline development will potentially cause fugitive dust emissions and equipment exhaust emissions from the associated construction equipment and worker travel. Well drilling will result in equipment exhaust emissions from the drilling equipment and from worker travel to the various work sites. Once a production well is complete, it is temporarily flow tested at the production test unit (PTU) at the power plant site. Emissions from the PTU include noncondensible gases contained in the brine and traces of the brine itself. An injection well is flow tested at the well pad. All of the above activities are associated with the construction of the project. At times, wells will need to be reworked or a new well drilled to replace an existing well, including flow testing of the reworked well. These emissions are listed separately as temporary emissions.

Power Plant

The construction of the power plant will potentially cause fugitive dust emissions; emissions from worker travel and equipment exhaust emissions from the associated construction equipment at the power plant site. After construction, the commissioning period will occur, where well flows will be combined and flowed through the power plant while the power plant components are tested. The PTU, steam vent tanks, and temporary steam blow locations in the steam pipelines are the source of emissions during this period.

During the operation of the power plant, the first potential emission point in the brine handling equipment is the dilution water heaters. Before the brine enters the clarifiers, it is allowed to flash any remaining steam or pressure to the dilution water heaters. This results in a steam exhaust plume that contains traces of the brine and residual noncondensible gases. A second source of emissions from the brine handling equipment is from the filter cake handling. The precipitated silica generated at the clarifiers is dewatered by filter presses and conveyed by conveyor for direct loading into trucks. Emissions from this activity are fugitive in nature and are mitigated by the damp nature of the filter cake (normally between 20 to 40 percent moisture), minimizing direct handling of the filter cake, and by tarping the truck after it is filled. Filter cake has an average particle size of less than 10 microns in diameter. The filter cake fugitive emissions contain particulate matter with traces of metals and radionuclides. The radionuclides are controlled with sulfate scale inhibitors added to the brine just after the first major flash. The filter cake is tested and disposed of at an appropriate landfill in accordance with applicable requirements based on its regulatory classification. Nonhazardous filter cake is disposed of at a licensed Class II landfill (Monofill) operated by an affiliate of the Applicant.

Almost all of the geothermal noncondensible gases in the geothermal brine flow with various stages of flashing steam to the turbine generator. After the steam is condensed by the turbine generator, most noncondensible gases remain in a gaseous state and are vented to the LO-CAT System for the control of hydrogen sulfide. After the LO-CAT, the gases are routed through a carbon adsorber for the control of benzene. Mercury and arsine are also reduced by this series of control equipment. The exhaust from the carbon adsorber is piped to the top of the cooling tower decks for dispersion of the remaining gases. There are two cooling towers, each with 10 cells. The condensed steam (condensate), containing some of the dissolved gases, is sent to oxidizers at the most northern cell of each of the cooling towers. These oxidizers prevent the offgassing of hydrogen sulfide from the condensate. These oxidizers operate identically to a liquid bioreactor. The condensate also contains ammonia that is offgassed during the cooling process. Drift from the cooling towers contributes emissions of particulate and trace metals. Thus, the cooling tower is the primary emission point for the entire power plant. Other potential operations emission sources include emergency electrical generators, fire pump, and maintenance activities.

An upset with the turbine generator, such as a turbine trip, will result in all of the high pressure steam, which contains almost all of the H_2S, being routed through a turbine bypass valve to the condenser. The noncondensible gases are then routed to the air pollution control equipment before venting at the cooling tower. The low and standard pressure steam, which contains minor amounts of H_2S, will be routed to the steam vent tanks. The steam vent tanks will emit the noncondensible gases along with trace amounts of constituents from the brine. Rework drilling of a well or drilling of a new well results in combustion exhaust emissions. At times, additional flow testing of these wells occurs. Noncondensible gases along with trace amounts of constituents from the brine are emitted during these operations. Plant startup also has the same type of emissions. All of the above emissions have been categorized as temporary emissions.

Transmission Line

Construction of the transmission line will potentially cause fugitive dust emissions, emissions from worker travel, and equipment exhaust emissions from the associated construction equipment.

5.1.2.2 Construction Emissions

5.1.2.2.1 Fugitive Dust

Fugitive dust will be emitted from the various disturbed areas because of grading, excavating, and construction at the project site. These areas include:

- Well pads
- Power plant site
- Access roads to the well pads/pipeline
- Access road to plant site
- Pipeline route
- Transmission route

Fugitive dust emissions from the above areas have been calculated short-term and annually. AP-42 and MRI fugitive dust emission factors were used in deriving the emissions. The controlled fugitive dust emissions are estimated to be approximately 2,600 pounds per month, based on 80 percent control efficiency from a fugitive dust suppression program. The fugitive dust suppression program is described in detail in Section 5.1.4.1. The resultant annual controlled emissions are estimated to be approximately 13.1 tons per year. Detailed information on the calculations is provided in Appendix G.1, Tables G-1 through G-1.6.

5.1.2.2.2 Combustion Emissions

Emissions from combustion equipment will occur over a 20-month period and be in three general areas: well drilling, construction activities involving the power plant (including pipelines) and the transmission line.

Well Drilling

During well drilling, criteria pollutant emissions have been estimated based on anticipated rig equipment and time expected to drill a well. A drilling rig in the Salton Sea area usually has diesel fired engines rated at a maximum of approximately 1,800 horsepower (hp). Table 5.1-18 lists these emissions on a per-well basis and well field totals annually. Each well on average is expected to take approximately two months to drill and complete based on past well drilling experience for other Salton Sea wells. An average of 61 days per well has been estimated for the wells. A total of nineteen wells will need to be drilled.

It is expected that a maximum of three drill rigs may be on site to complete the drilling program within the 20-month well construction period. The three rigs are anticipated to drill an equivalent of 900 days within an annual period. Mitigation measures for this activity are described in detail in Section 5.1.4.2.

Detailed information regarding the emissions calculations is provided in Appendix G.1, Table G-2.

Staffing for drilling a well consists of 6 crews, with 12 people per crew, working 12 hour shifts. Three crews work day shifts, and three work night shifts. Approximately 176 truck trips per well are expected during a two-month drilling period.

Emissions from worker travel and delivery trucks for drilling have been included in the calculations for the power plant site and are discussed below.

Power Plant Construction Equipment

For the power plant, a breakdown of construction equipment, monthly summary, staffing schedule, construction work force, and truck delivery schedules have been provided and are included in Appendix G.1. These lists include the construction of the pipelines and the construction of the transmission line. Information regarding the transmission line has been provided by IID.

Based on these tables, criteria pollutant emissions have been calculated and the results presented in Table 5.1-19. Mitigation measures for this activity are described in detail in Section 5.1.4.3.

Detailed information on the emission calculations is provided in Appendix G.1, Tables G-3 through G-3.11 regarding construction equipment emissions, worker travel emissions and delivery truck emissions information.

5.1.2.2.3 Well Flow Testing

Once a production well is complete, the well is piped up to the PTU at the power plant site for a well test. The rig usually remains on the pad in case further drilling activities are necessary. A well test includes allowing the well to flow at its maximum rate, which is estimated to be approximately 1.2 million pounds of geothermal brine per hour. A flow test can last up to approximately 96 hours. Anticipated flow schedule for the various wells is as follows:

- Production wells – 96 hours per well (one well on each of Pads OB1 – OB4)
- Production wells – 72 hours per well (one well on each of Pads OB1 – OB4)
- Production wells – 48 hours per well (both wells on Pad OB-5)

For injection and plant wells, the flow test occurs at the well pad sites with a mobile test unit. The flow rates are lower, at approximately 1.0 million pounds per hour, and can continue for about 48 hours.

Table 5.1-20 lists the air pollutants expected from the flow tests, and the total annual maximum emissions expected from testing 15 wells.

Detailed information regarding the emission calculations is provided in Appendix G.1, Table G-4.

5.1.2.2.4 Total Construction Emissions

Table 5.1-21 presents the total criteria pollutant emissions anticipated in constructing the SSU6 Project annually. For the noncriteria pollutants refer to Table 5.1-20.

While these construction emissions may appear to be higher than other recently permitted power plant projects firing natural gas in California, it is because those projects did not review the emission impacts for developing their own energy/fuel source. If these emissions associated with, drilling natural gas wells, testing the wells, treating the natural gas, constructing pipelines and compression stations from the gas field to the power plant were considered for a gas fired power plant, the total construction emissions for the SSU6 Project are anticipated to compare quite favorably.

5.1.2.2.5 Plant Commissioning

Plant commissioning involves numerous activities that occur one time to bring the proposed power plant online in a safe and prudent manner. These activities include:

- Well warmup
- Production line warmup
- Preheat RPF vessels
- Steam blow
- Turbine preheat
- Various load tests
- Turbine performance test

An estimate of the hours required for each of these activities has been assessed. The duration of any of the tests or activities can be affected by unforeseen events and therefore reasonable estimates are provided.When the power plant is ready for commissioning, the brine flow from a production well will be routed to the PTU for well warmup. This occurs for approximately 18 hours. After the warmup, the brine flow is routed to the main production line to flow through the plant. Steam generated is vented at the steam vent tanks. In addition to the production line warmup, the brine and steam preheat the RPF vessels. These activities occur for approximately 6 hours; however, the steam vent tanks will continue venting steam throughout the remaining commissioning period. The rest of the production wells (eight) are then routed to the PTU for 18 hours each. After each well warmup, they too are conveyed to the main production pipeline, where the brine flows through the plant and the steam is vented to the steam vent tanks. When all nine wells are flowing, steam blows commence at this point, as steam is routed through selected steam pipelines up to the turbine and vented through temporary openings. After a run of approximately 12 hours at each of the six steam lines, the turbine preheat and other various tests occur. Once the testing is completed, the turbine performance test starts.

Overall, 14 days or 354 hours of commissioning activities are expected to bring the power plant to a state of readiness. Table 5.1-22 lists the total air pollutant emissions expected from plant commissioning.

Detailed flow test information regarding the emission calculations is provided in Appendix G, Tables G-5 to G-5.6.

5.1.2.3 Operating Emissions

The SSU6 Power Plant is proposed as a base-loaded operation, generating electricity 24 hours per day, 365 days per year. Emissions are based on the maximum design flow rate of geothermal brine during summer time conditions to generate 175 megawatts (MW). In the wintertime, the megawatts that can be generated at this design flow rate are approximately 185 MW. Base-load operations are not expected to be below 175 MW.

5.1.2.3.1 Cooling Towers

The cooling towers are the primary source of air emissions at the power plant. These emissions are emitted in three different modes:

- dispersion of noncondensible gases
- offgassing, and
- drift

Each mode is described generally in Section 5.1.2.1. The following paragraph provides a detailed description of the emissions and emitting processes associated with the cooling tower operations during normal operations.

Noncondensible Gases

The noncondensible gases, which follow the flashing steam of the brine, collect in the condenser of the turbine generator, along with the condensate. Some gases, especially hydrogen sulfide and ammonia, partially remain in the condensate. Most of the collected gases do not. These collected noncondensible gases are vented to a LO-CAT System.

The LO-CAT System is a liquid reduction-oxidation process that uses a chelated iron solution to convert hydrogen sulfide to elemental sulfur (S). The LO-CAT System can achieve high efficiencies and also have high turndown capabilities. The system employs a non-toxic iron catalyst to assist in the reaction between hydrogen sulfide and oxygen. The products are water and sulfur. The general chemical reactions are presented below:

(1) H_2S (vapor) + $H_2O \rightarrow 2\ H^{+1} + S^{-2}$
(2) $S^{-2} + 2\ Fe^{+3} \rightarrow$ Sulfur + $2\ Fe^{+2}$
(3) ½ O_2 (vapor) + $H_2O + 2\ Fe^{+2} \rightarrow 2\ HO^{-1} + 2\ Fe^{+3}$
(4) $2H^{+1} + 2\ HO^{-1} \rightarrow 2\ H_2O$

The absorber and oxidizer areas are contained in one vessel and separated by baffles. Noncondensible gases enter the absorber section of the unit and the oxidized iron solution converts the hydrogen sulfide to elemental sulfur. The reduced iron solution circulates to the oxidizer area where it is contacted with air and reoxidized and available to convert more hydrogen sulfide.

The Applicant is proposing emission controls for the noncondensible gases from the cooling towers. The Applicant is proposing a permitting control level for hydrogen sulfide of 99.5 percent of the noncondensible gas emissions from the cooing towers. The LO-CAT System will also reduce mercury emissions. After hydrogen sulfide emissions are reduced by the LO-CAT System, the air stream will be pumped to a series of carbon adsorbers for the control of benzene. This is the first time that carbon adsorbers have been proposed for the Salton Sea Units and the first time they are to be used for the control of benzene in geothermal facilities. Pilot testing has been conducted and has indicated excellent results for benzene. Based on these results, the Applicant is proposing 95 percent control efficiency for benzene. While it can be expected that similar organic noncondensible gases will also be controlled, because no testing of these gases has been conducted, no control assumptions will be made in this analysis. Arsenic in the noncondensible gas stream is anticipated to be reduced by 90 percent collectively by the two systems. After the carbon adsorbers, the noncondensible gases are conveyed to each of the 20 cells at the cooling tower and equally released. The following air pollutants of interest are anticipated to be present in the noncondensible gas stream:

Ammonia	Hydrogen Sulfide
Arsenic	Mercury
Benzene	Radon
Ethylbenzene	Toluene
	Xylenes

This list is based on information and data from testing results from the nearby Salton Sea geothermal facilities. Emission rates for these pollutants of interest are listed in Table 5.1-23. Also emitted are carbon dioxide, methane, and hydrogen, which are not reviewed in the table or discussion.

Detailed information regarding the emission calculations is provided in Appendix G.1, Table G-6.

Offgassing

As noted earlier, some of the noncondensible gases partition to the condensate. These gases include hydrogen sulfide and ammonia. When these condensates are collected they are conveyed to an oxidizer at one of the cells at each of the cooling towers. The oxidizers operate as a liquid bioreactor and convert the hydrogen sulfide in solution to sulfate in the condensate. Several Salton Sea geothermal facilities have been equipped with these oxidizers in an effort to reduce chemical usage and more effectively control biological growth in the cooling tower. Test data suggests a secondary benefit of reducing hydrogen sulfide emissions from the towers. In practice, these oxidizers have reduced hydrogen sulfide concentration levels down to nondetectable levels in the cooling tower exhaust. As such, the Applicant is proposing a hydrogen sulfide permitting control level of 95 percent for the SSU6 Project. Other partition gases are not affected by the oxidizers.

Biofiltration uses naturally occurring bacteria (thiobacilli) to oxidize the H_2S to elemental S or sulfate ion (SO_4). The oxidation of the hydrogen sulfide by this organism occurs in a stepwise fashion generally described by the following reactions:

(5) H_2S Solution + ½ $O_2 \rightarrow S + H_2O$
(6) $S + {}^3/_2\, O_2 + H_2O \rightarrow SO_4$ ion

In this process, the liquid stream consisting primarily of water with low concentrations of hydrogen sulfide is contacted with the thiobacilli bacteria to allow the above reactions to proceed. The water acts as a wetting agent and also removes the oxidation products from the process to allow these organisms to thrive and maintain their abatement efficiency. Standard cooling tower packing is used as a substrate onto which the organisms adhere, thus providing the reaction sites necessary to achieve high efficiency abatement. To sustain the organism's growth, nutrient requirements for nitrogen, phosphorus, potassium, and carbon must be met. The liquid stream contains carbon in the form of dissolved carbon dioxide along with amounts of ammonia to provide the nitrogen. Additional nutrients are added as required.

After the oxidizer, the condensate is routed through the cooling towers where the remaining noncondensible gases can be stripped or offgassed. These emissions are dependent on the amount of condensate necessary for cooling tower makeup, which is dependent on the cycles of concentration and ambient temperature. The hourly emission rates listed in Table 5.1-24 are the expected maximums, which occur at low cycles of cooling tower concentration, and high ambient temperatures. Wintertime and annual average emissions are lower. Annual ammonia emission rates are listed in Table 5.1-24 and are based on annual average conditions, while hydrogen sulfide emissions are listed as a maximum.

Detailed information regarding the emission calculations is also provided in Appendix G.1, Table G-6.

Drift

The cooling towers use the condensate for cooling tower makeup. Substances present in the condensate can be contained in the drift of the cooling tower. Drift is the entrained cooling water carried from the cooling tower by the exhaust air. The Applicant is proposing to have a control drift efficiency of 0.0006 percent. Emission rates from cooling tower drift are listed in Table 5.1-25. These emission rates are also dependent on the cycles of concentrations of the cooling towers and are based on maximum cycles of concentration and maximum concentration of total dissolved solids in the blowdown at the cooling towers. The listed emissions are maximums.

Detailed information regarding the emission calculations is provided in Appendix G.1, Table G-7. Table 5.1-26 lists the overall maximum totals that can be present in the exhaust from the cooling towers, except for ammonia, which is an annual average.

5.1.2.3.2 Dilution Water Heaters

Before brine can enter the clarifiers, it must be relieved of any steam or pressure. This remaining flash occurs in two atmospheric flash tanks. The resultant steam, which can contain traces of noncondensible gases and liquid brine carryover, is conveyed to the dilution water heaters (DWH).

The DWH condenses a fraction of the steam and the remaining steam exhausts to the atmosphere. The resultant condensate from the DWH is used as makeup process water for the power plant. Table 5.1-27 presents the maximum emissions from the dilution water heater system.

Detailed information regarding emission calculations is provided in Appendix G.1, Table G-9.

5.1.2.3.3 Silica Filter Cake Handling

Precipitated solids in the brine are first settled in the clarifiers. The underflow of the clarifiers is sent to filter presses for dewatering. Silica filter cake with approximately 20 to 40 percent moisture is generated at a rate of approximately 120 tons per day. The filter cake is directly loaded by conveyor into dump trucks for transport to the Desert Valley Company Monofill Facility, a Class II landfill specifically built for the disposal of nonhazardous geothermal materials. After loading, the trucks are tarped to prevent fugitive dust emissions. The trucks remain at the plant until analytical results are received to ensure the material is transferred to the appropriate disposal facility. The trucks are expected to remain at the plant for no more than five days.

The filter cake is largely composed of an amorphous silicate with varying amounts of heavy metals. Sulfate scale inhibitors, used in the process have a secondary benefit of reducing radium levels to below 10 pCi/gram. Uninhibited filter cake ranges from 10 pCi/gram to approximately 250 pCi/gram of Ra226. The typical radium concentration in soil is 1 pCi/gram, and in general ranges from 0.3 to 5.4 pCi/gram (American Society for Testing and Materials [ASTM], 1994). Traces of radon have the potential to be emitted from the stored filter cake. Table 5.1-28 presents the emissions resulting from silica filter cake handling operations.

Detailed information regarding emissions calculations is provided in Appendix G.1, Tables G-10 and G-10.1.

5.1.2.3.4 Sulfur Filter Cake Handling

The LO-CAT System generates a sulfur solution. The liquid is conveyed to a filter press for dewatering. Sulfur filter cake with approximately 40 percent moisture is generated at a rate of approximately 2.5 tons per day. The sulfur filter cake is directly loaded by conveyor into bins for transport for disposal or sold as a raw sulfur feed stock. After loading, the bin is tarped to prevent fugitive dust emissions.

The filter cake is largely composed of sulfur and water with traces of other substances. Table 5.1-29 presents the emissions resulting from sulfur filter cake handling operations.

Detailed information regarding emissions calculations is provided in Appendix G.1, Table G-10.1.

5.1.2.3.5 Emergency Generators/Fire Pump

The Applicant is proposing to have two diesel fired emergency generators and a fire pump at the power plant. The emergency generators are sized at 300 kilowatts (480 kilovolts [kV]) and 2000 kilowatts (4160 kV). Table 5.1-30 presents the peak hourly emissions and the resultant emissions of the emergency generators and fire pump with a 200 hour per year limit. The engines will not be tested at the same time, or on the same day.

Detailed information on the emission calculations is provided in Appendix G.1, Table G-11.

5.1.2.3.6 Operating and Maintenance Equipment

The Applicant anticipates running maintenance equipment during the operation of the power plant. A list of sources has been prepared and their anticipated emissions are presented in Table 5.1-31.

Detailed information on the emission calculations is provided in Appendix G.1, Tables G-12 and G-12.1.

5.1.2.3.7 Total Operating Emissions

The total operating emissions from the project are presented in Table 5.1-32.

Refer to Appendix G.1, Table G-13 for detailed information.

5.1.2.4 Potential Temporary Emissions

The following emission sources are not routine but are expected to occur from time to time. Their accumulative duration and frequency have been estimated from past experience at the existing Salton Sea Units.

5.1.2.4.1 Well Rework/New Well Drilling

With the passage of time, the existing wells may experience issues with capacity and pressure drop. Normally these are not issues associated with the geothermal reservoir but with the specific conditions around a well. In keeping with normal geothermal production, the Applicant anticipates the following rework schedule:

- Production Wells. A coil tubing clean-out of each production well (10 total) is scheduled every 2 to 6 years, with an average of 4 years. This involves two 2-ton trucks (one water truck, one nitrogen truck). Duration of work is 3 days. No drilling rig is required.
- Production Wells. Re-drill of a production well (10 total) is typically scheduled from 7 to 17 years, with an average of 12 years. The drilling rework of one well per year is anticipated. This type of rework requires 21 days. A drilling rig is required. New pipe is not installed in the well.
- Injection Wells. A re-drill of each injection well (7 total) is planned every 2 to 4 years. One to two wells per year are anticipated to require re-drilling. This type of work requires 10 days. This work requires a drilling rig, and new pipe is installed in the well.
- Plant Well. A re-drill is scheduled every 3 years (1 well). This requires 8 days. This work requires a drilling rig. New pipe is not installed in the well.
- Condensate well. A re-drill is scheduled every 4 years (1 well). This requires 10 days. This work requires a drilling rig. New pipe is not installed in the well.

Table 5.1-33 shows emissions estimated based on occurrence in pounds per hour and annual emissions based on 50 days per year of drilling. Refer to Section 5.1.2.2.2 for further information.

Detailed information on the emission calculations is provided in Appendix G.1, Table G-2.

5.1.2.4.2 Well Flow Activities

Warming up a production well requires approximately 5 hours for a cold start and 2 hours from a warm start. Wells are warmed up following clean-out or re-drill activity or before a plant startup. Additionally, it is estimated that each of the 10 production wells will be shut down for operational reasons twice per year. A warm up is required after each shutdown. In a year with no coil tubing clean-outs or re-drills, the flow activities are estimated to be approximately 40 hours per year. A coil tubing clean-out will require an additional 48 hours per well. Three coil tubing clean-outs are anticipated per year. The redrilling of a production well will also require a flow run of about 48 hours. Only one redrilling of a production well is anticipated per year. The redrilling of an injection well requires a flow run of approximately 18 hours. Redrilling of three injection wells is anticipated each year. As noted in Section 5.1.2.2.3, the brine flow from a production/flow run is routed to the PTU. A flow run at an injection well occurs at the pad. An accumulative total of 286 hours per year (232 hours at the PTU and 54 hours at the injection pads) was used to derive the expected annual emissions from this activity. Table 5.1-34 provides the potential emissions based on the factors presented in Section 5.1.2.2.3.

Detailed information regarding emission calculations is provided in Appendix G.1, Table G-14.

5.1.2.4.3 Steam Vent Tanks

In situations where there is a turbine trip and the turbine cannot receive the steam generated, the excess steam is routed to a turbine bypass and to the steam vent tanks. This system is also used for cold and warm plant startups and shutdowns. These types of occurrences release the noncondensible gases and traces of metals from the brine. The Applicant expects a trip to occur six times a year and last for less than two hours each occurrence. An accumulative total of 50 hours at 100 percent load has been assumed in the annual emissions presented in Table 5.1-35. Cold plant startup emissions of the power plant are presented in the next section.

Detailed information regarding emission calculations for all sources involved with a turbine trip situation is provided in Appendix G, Table G-15.

5.1.2.4.4 Plant Startup

The Applicant anticipates that a cold plant startup could occur each year. An accumulative total of 45 hours per year has been used in calculating the annual emissions as listed in Table 5.1-36.

Detailed information regarding emission calculations is provided in Appendix G.1, Table G-16.

5.1.2.5 Air Dispersion Modeling

This section describes the dispersion models and modeling techniques that were used in performing the air quality analysis for the SSU6 project. The assessment was based on using U.S. EPA approved air quality dispersion models.

The models included:

- Building Profile Input Program, and
- Industrial Source Complex – Short Term (Industrial Source Complex-Short-Term, Version 3 Model [ISCST3]).

These two models, along with options for their use, are presented below. The model results were used for the following:

- Comparison of impacts to significant impact levels,
- Compliance with California and Federal Ambient Air Quality Standards,
- Input data for health risk assessments,
- Assessment of impacts to soil and vegetation,
- Assessment of cumulative impacts.

Several other models were used for specialized purposes. They included:

- SCREEN3 for fumigation impact analysis, and
- CALPUFF for visibility assessment, and
- OLM Model for NO_2 assessment.

These models are discussed in Section 5.1.2.6, or in Section 5.1.2.7. The approved modeling protocol for the project is included in Appendix G.2a.

5.1.2.5.1 Model and Options

Building Profile Input Program

When stack heights are lower than good engineering practice, in relation to surrounding structures or buildings, air dispersion from the source can be affected by building downwash. This situation occurs when a plume is drawn into the lower pressure region that usually exists on the downwind side of a building. This assessment was conducted in accordance with U.S. EPA guidance (U.S. EPA, 1985). All major structures were assessed. Appendix G.2 Table G-17 contains the building data used in the Building Profile Input Program (BPIP, Version 95085). Results of the BPIP assessment were included in the ISCST3 runs. The ISCST3 model uses the Huber-Snyder algorithm in assessing the downwash effects.

ISCST3

The ISCST3, Version 02035, was used for assessing short term concentrations (i.e., 1-, 3-, 8- and 24-hour) and annual concentrations emitted during construction, operation, and potential temporary emissions. ISCST3 was used with the following options:

- Final plume rise at all receptors
- Stack-tip downwash
- Buoyancy–induced dispersion
- Calms processing
- Default wind profile exponents, and
- Default vertical potential temperature gradients

An analysis was performed to determine whether to use rural or urban dispersion parameters for the ISCST3 modeling analysis. This analysis used the procedures of Auer (1976) and included drawing a 3 km radius around the project site. Within this region, land use was classified as either rural or urban. The rural land use classifications include the following:

- A1 – Metropolitan natural (golf courses, campuses, cemeteries, etc.)
- A2 – Agricultural rural
- A3 – Undeveloped, uncultivated wasteland
- A4 – Undeveloped rural
- A5 – Water surfaces (rivers, lakes, etc.)
- R1 – Common residential (single family)
- R4 – Estate residential (single family)

Based on these classifications, over 95 percent of the land use within 3 km of the project site is identified as rural. Therefore, rural dispersion coefficients were used for the modeling analysis.

5.1.2.5.2 Meteorological Data

The ISCST3 model uses hourly meteorological data to characterize plume dispersion and the resultant ambient impact. This data must meet criteria established by U.S. EPA and the following discussion details the proposed data and its applicability to the SSU6 project.

There are several National Weather Bureau Army Navy stations (WBAN) in the general area of the proposed facility. The closest most representative station relative to the proposed site is the Imperial County Airport Station. This WBAN station provides meteorological data that can be readily converted to a site dispersion database that is directly used by ISCST3. Other WBAN stations with current data in this area include Palm Springs, Blythe Airport, Yuma Arizona Airport, and the San Diego Airport. As illustrated on Figure 5.1-4, the Imperial County Station is closest to the proposed project site (approximately 25 miles south) in the central valley area between the Santa Rosa, Laguna, and Chocolate Mountains and south of the Salton Sea.

Clearly none of the other WBAN stations are as representative. The Imperial County Airport meteorological data were collected for the years 1995 to 1999. These data are the most recently available from the station (graphical wind roses were produced using the five years of meteorological data and were discussed and presented in Section 5.1.1.2).

Because of the distance between the project site and the Imperial County Airport, an assessment of representativeness of the meteorological data to the project site was conducted. U.S. EPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates from the Clean Air Act in Section 165(e)(1), which requires an analysis "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility."

This requirement and U.S. EPA's guidance on the use of onsite monitoring data are also outlined in the *On-Site Meteorological Program Guidance for Regulatory Modeling Applications* (U.S. EPA, 1987). The representativeness of meteorological data is dependent on: (a) the proximity of the meteorological monitoring site to the area under consideration; (b) the complexity of the topography of the area; (c) the exposure of the meteorological sensors; and (d) the period during which the data are collected.

Representativeness has been defined in the document "Workshop on the Representativeness of Meteorological Observations" (Nappo et al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Judgments of representativeness should be made only when sites are climatologically similar, as is the case with the Imperial County Airport and the project site location. Representativeness has also been defined in the PSD Monitoring Guideline as data that characterize the air quality for the general area in which the proposed project would be constructed and operated.

In determining the representativeness of the meteorological data set for use in the ISCST3 runs at the project site, the following considerations were addressed:

- *Aspect ratio of terrain, which is the ratio of the height of terrain to the width of the terrain at its base* - The ratio of terrain heights to base widths is constant for the terrain surrounding the project site and the Imperial County Airport meteorological site.
- *Slope of terrain* - The slope of the terrain in the area of the project site is similar to the slope of terrain near the meteorological site. The surface roughness of the terrain in the area is also similar.
- *Ratio of terrain height to stack/plume height* - Because the terrain at the Imperial County Airport site and the project site are essentially flat and at elevations below mean sea level, terrain effects on plume dispersion would be similar at locations throughout the regional area, and the plume would disperse in an identical manner to the dispersion conditions monitored at the Imperial County Airport site.
- *Correlation of terrain features to prevailing meteorological conditions* - The orientation of terrain in the region, with respect to both the meteorological data and project sites is similar and correlates well with the prevailing wind field in the Imperial Valley Region. Thus, wind flow at the Imperial County Airport site would be similar to that at the project site. No local topographic features exist that would appreciably distort the local wind field.

Preparation of the Meteorological Data Set

As recommended by the U.S. EPA in the Guideline on Air Quality Models (GAQM, EPA, 2000), 5 years of meteorological data are used. National Climatic Data Center (NCDC) provided the data for WBAN ID 03144, Imperial County Airport. A copy of the data set is included in the separate modeling CDs. Upper air data for the same time period were taken from the closest National Weather Service (NWS) representative upper station, Tucson, Arizona. The data has been pre-processed for direct use in the ISCST3. Data processing has followed U.S. EPA recommended procedures for substitution of missing data and calm hour processing. The data recovery of one of the key parameters, cloud cover, was low for the period (7/01/96 – 8/27/96). Cloud cover is used to calculate atmospheric stability, which is an important parameter used by the air quality models for prediction of impacts based on the air pollution emission estimates associated with an existing or proposed facility. Although the annual data recovery values for a few parameters are slightly below the standard criteria of 90 percent, the use of 5 years in this case should provide more than adequate data for developing conservative plant impact evaluations.

The percent of valid data recovery for the necessary meteorological parameters for each year is listed in Table 5.1-37. Missing data were substituted per U.S. EPA recommended procedures, as discussed in the U.S. EPA memorandum, *(Lee, 1992)***.** Periods with more than one consecutive missing hour of wind speed or wind direction were set to calm/missing to ensure that worst case predicted impacts were resulting from actual rather than interpolated meteorological conditions. Missing upper air data for periods of one day were interpolated, while periods of more than one day were replaced with Holzworth seasonal averages for this area.

The surface data were acquired from NCDC in TD9956 format. This non-standard format is not readily usable by the air quality analysis programs. Therefore, the data sets were reformatted into the CD 144 data format, one of the formats which U.S. EPA's meteorological preprocessor program PCRAMMET will accept. The PCRAMMET program from the U.S. EPA SCRAM bulletin board was then used to process the data and merge the coincident mixing data into data files that can be input into the ISCST3 Air Quality Model. A copy of the data set used as inputs to the ISCST3 Model is also included in the separate modeling CDs.

5.1.2.5.3 Receptor Locations

The following receptor grid spacing was used in the modeling analysis:

Along fence line	30 meter spacing
From fence line to 0.5 km (downwash)	30 meter spacing
From 0.5 km to 1 km	100 meter spacing
From 1 km to 10 km	250 meter spacing

Figures 5.1-5 and 5.1-6 present views of the 10-km and 1-km receptor grids. For maximum impacts occurring outside the 0.5-km radius, a 30-meter grid extending 1,000 meters around the point was used. The receptor locations were designated using Universal Transverse Mercator (UTM) coordinates based on North American Datum of 1927 (NAD27).

Digital Elevation Model (DEM) data were obtained from the US Geological Survey (USGS) based on the National Geodetic Vertical Datum of 1929. Since these initial DEM files were complied, agricultural and other manmade activities have modified the topography in the area to apparently accommodate the current irrigation systems. The most recent USGS topographical maps (1992) provide elevations that correspond to current conditions.

Where there were differences in the DEM files to the most recent USGS topographical maps, the elevations of the area of the project were adjusted to reflect the USGS maps. Therefore, the available DEM file elevations were manually edited to reflect current elevations in the immediate area surrounding the proposed project. Additionally, updated elevations for the Obsidian Butte were used in place of the historical DEM data and the USGS maps. Obsidian Butte has recently been used extensively as a source of stone, and significant elevation changes have occurred since the development of the DEM data and the most recent issue of the USGS maps. The updated elevations for Obsidian Butte have been supplied by a site survey performed by a California Registered Land Surveyor. Copies of the DEM files have been included in the separate modeling

CDs. Project stack and building coordinates were obtained in NAD83 and then converted to NAD27 to conform to the coordinate system used in creating the receptor grid (referenced above). Tables G-17 and G17.1 in Appendix G.2 present the coordinates for the stack and building coordinates in both coordinate systems.

5.1.2.5.4 Modeling Scenarios

The modeling for the SSU6 Project required the determination of worst-case emissions scenarios from the following averaging periods and pollutants to demonstrate compliance with the California and federal ambient air quality standards:

1 hour:	CO, NO_2, SO_2 and H_2S
3 hour:	SO_2
8 hour:	CO
24 hour:	PM_{10} and SO_2
Monthly/Quarterly:	Lead
Annual:	PM_{10}, NO_2 and SO_2

All of the input and output modeling runs discussed in the following section are included in the modeling CDs.

5.1.2.5.5 Construction Impact Modeling

There are several activities causing air emissions that occur during the construction phase of the project. To recap, they include:

- Fugitive dust emissions
- Well drilling combustion emissions
- Construction equipment exhaust emissions
- Well flow testing, and
- Plant commissioning

The modeling scenarios necessary to assess their impact to ambient air quality standards are described below by pollutant.

Particulate Matter

The first four activities are expected to be occurring during the same period. For PM_{10}, an assessment was made to determine the combined worst-case month of emissions. That is expected to occur in Month 18 of the construction period. An annual worst-case emission assessment was made by the rolling average method. Table G-1.6 in Appendix G.1 contains the details of this assessment. Two averaging periods were modeled:

24 hour:	PM_{10}
Annual:	PM_{10}

The following parameters were used for this evaluation:

- Fugitive dust was modeled as two area sources (wind erosion and equipment generated) covering the project site using a release height of 2.0 meters.

Refer to Table G-1.6 in Appendix G.1.

- Well drilling was modeled as equivalent point sources with three rigs operating at the same time for the 24 hour averaging period. The three rig locations causing the highest collective concentrations were used in the evaluation. Table G-18, *Construction Screening Review*, in Appendix G.2 lists the results of this evaluation. For the annual period a total of 15 wells were used with the same stack parameters.

Sources	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
15-Annual (3-24 Hr)	14 feet	855 °F	1.33 feet	112 fps

Refer to Table G-2 in Appendix G.1.

- Construction equipment exhaust was modeled as four equivalent point sources uniformly emitting the equipment exhaust emissions.

Sources	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
4	12 feet	850 °F	0.49 feet	298 fps

Refer to Table G-3 in Appendix G.1.

- Well flow testing was modeled as six point sources.

Production Flow Run:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	50 feet	226.7 °F	9 feet	40 fps

Injection Flow Run:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
5	37.92 feet	226.7 °F	6 feet	48.7 fps

Refer to Table G-4 in Appendix G.1.

The source causing the highest short term concentration was selected in the refined modeling. Table G-18, *Construction Screening Review*, in Appendix G.2 lists the results of this evaluation. For the annual period, a total of five sources were used.

Other Criteria Pollutants

For the other criteria pollutants, the same assessment was conducted to determine the combined worst-case month of emissions. Both NO_2 and SO_2 have peak emissions in Month 15, and CO peaks in Month 16 of the construction period. Table G-3.1 through G-3.4 in Appendix G.1 also contains the details of this evaluation. The following averaging periods were modeled:

1 hour:	CO, NO_2 and SO_2
3 hour:	SO_2
8 hour:	CO
24 hour:	SO_2
Annual:	NO_2 and SO_2

The following parameters were used for these evaluations:

- Well drilling had the same modeling inputs as presented for the PM_{10} evaluation.

Refer to Table G-2 in Appendix G.1.

- Construction equipment exhaust had the same modeling inputs as presented for the PM_{10} evaluation.

Refer to Tables G-3.1, G-3.2, and G-3.4 in Appendix G.1.

Hydrogen Sulfide

Only the well flow testing would be emitting H_2S during the main construction period. The following averaging period was modeled:

1 hour: H_2S

The following parameters were used for this evaluation:

- Well flow testing had the same modeling inputs as presented for the PM_{10} evaluation.

Refer to Table G-4 in Appendix G.1.

Plant Commissioning

Plant commissioning is expected to occur after the finish of construction, and therefore is not expected to be combined with any other activity. Additionally, commissioning is a temporary activity occurring only one time, and thus the following pollutants and averaging periods were modeled:

1 hour:	H_2S
24 hour:	PM_{10}

Plant commissioning emissions are emitted at three sources, the PTU, the steam vent tanks, and the dilution water heaters. Three scenarios were reviewed, representing the various activities occurring, i.e., Scenario 1, one well venting at the PTU while seven wells emit at the steam vent tanks, and Scenario 2, all nine wells releasing at the steam vent tanks. Additionally, during the steam blow period (Scenario 3), the individual steam blows were modeled with the steam vent tanks releasing the remaining steam. Modeling parameters for Scenario 1 are presented below. For this and other scenarios, the data are listed in Appendix G.1, Tables G-5.3 to G-5.6.

PTU:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	50 feet	226.7 °F	9 feet	40 fps

Steam Vent Tank (low pressure):

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	60 feet	246.1 °F	10 feet	39.9 fps

Steam Vent Tank (standard pressure):

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	60 feet	298.9 °F	10 feet	33.8 fps

Steam Vent Tanks (high pressure):

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
2	60 feet	322.2 °F	10 feet	39.2 fps

Dilution Water Heaters:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
2	45 feet	213.1 °F	8 feet	15.6 fps

5.1.2.5.6 Operations Impact Modeling

The air emissions associated with operating activities include:

- Fugitive dust emissions from filter cake handling and operating/maintenance equipment
- Noncondensible gases being emitted at the cooling towers
- Offgassing at the cooling towers
- Drift from the cooling towers
- Dilution water heaters
- Emergency generators and fire pump
- Operating and maintenance exhaust equipment.

The modeling scenarios necessary to assess their impact on ambient air quality standards are described below by pollutant.

Particulate Matter

PM_{10} will be emitted as fugitive dust emissions from the filter cake handling and from the operating and maintenance equipment. This operating and maintenance equipment will also generate PM_{10} emissions from equipment exhaust. Other sources of PM_{10} emissions include the drift from the cooling towers, the dilution water heaters and the exhaust from the emergency generators and fire pump. Two averaging periods were modeled:

24 hour: PM_{10}
Annual: PM_{10}

The following parameters were used for this evaluation:

- Fugitive dust emissions generated from filter cake handling activities were modeled as several volume sources.

Source	*Release Height*
Silica Filter Cake Handling (two)	12 feet

Sulfur Filter Cake Handling (one)	12 feet

- Fugitive dust emissions generated from operations and maintenance equipment on paved and unpaved roads were modeled as 10 area sources.

Source	*Release Height*
Paved Roads (3)	2 meters
Unpaved Roads (6)	2 meters
Plant Site	2 meters

Refer to Tables G-10, G-10.1 and G-12.1 in Appendix G.1.

- Drift from cooling tower was modeled as 20 point sources (one for each of the 20 cells).

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
20	58 feet	Varies	32 feet	33 fps

Stack temperatures vary by season and by brine throughput at the brine handling facilities. The following values were used:

	Temperature
Summer:	96.1 °F
Annual average:	80.4 °F
Winter:	72.6 °F

A screening level analysis was conducted to determine the parameters that generated the highest concentrations. Refer to Table G-7 in Appendix G.1 for emissions and Table G-19 in Appendix G.2 for the operations screening review.

- Exhaust from the Dilution Water Heaters was modeled as two point sources

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
2	45 feet	213.1 °F	8 feet	varies

Stack velocity varies by season and by brine throughput. The following values were used:

	Velocity
Summer:	31.9 fps
Annual average:	30.5 fps
Winter:	30.2 fps

A screening level analysis was conducted to determine the parameters that generated the highest concentrations. Refer to Table G-7 in Appendix G.1 for emissions and Table G-19 in Appendix G.2 for the operations screening review.

- Emergency generators and fire pump were modeled as point sources:

Source	*Stack Height*	*Stack Temp*	*Stack Diameter*	*Stack Velocity*
Emergency Generator (480)	40 feet	793 °F	0.67 feet	128 fps
Emergency Generator (4160)	60 feet	963 °F	1.5 feet	160 fps
Fire Pump	40 feet	855 °F	0.5 feet	128 fps

Refer to Table G-11 in Appendix G.1.

- Operating and maintenance equipment were modeled as several point sources:

Source	*Stack Height*	*Stack Temp*	*Stack Diameter*	*Stack Velocity*
17	12 feet	850 °F	0.333 feet	298 fps

Five point sources were used to characterize the one truck that transfers trailers from the filter cake handling area to the trailer storage area, and 12 point sources were used to characterize the other equipment operating in the main power plant area.

Refer to Table G-12 in Appendix G.1.

Other Criteria Pollutants

For the other criteria pollutants, the following averaging periods were modeled.

1 hour:	CO, NO_2, and SO_2
3 hour:	SO_2
8 hour:	CO
24 hour:	SO_2
Annual:	NO_2 and SO_2

The following parameters were used for these evaluations:

- Emergency generators and fire pump were modeled using the same modeling inputs as presented for the PM_{10} evaluation.

Refer to Table G-11 in Appendix G.1.

- Operating and maintenance equipment were modeled using the same modeling inputs as presented for the PM_{10} evaluation.

Refer to Table G-12 in Appendix G.1.

Hydrogen Sulfide

For H_2S, two sources were modeled to determine the impact on the 1 hour standard. The following parameters were used for this evaluation:

- H_2S emitted at the cooling tower was modeled as 20 point sources (one for each cooling tower cell). Two of the cells had higher H_2S emission rates because of the offgassing at the oxidizer cells. Exhaust parameters had the same modeling input as presented in the PM_{10} evaluation.

Refer to Table G-6 in Appendix G.1.

- Exhaust from the Dilution Water Heaters had the same modeling input as presented in the PM_{10} evaluation.

Refer to Table G-9 in Appendix G.1.

Health Risk

Modeling was conducted to determine the health risk impact at the nearest resident location under normal operating conditions using the same procedures as outlined above. The nearest resident is at the Sonny Bono National Wildlife Refuge at UTM coordinate 629171E and 3671581N (elevation of -225 feet), approximately 0.7 miles east-northeast (1.1 km) of the fence line. The next nearest resident is approximately 2.0 miles (3.2 km) to the east. One emission source not characterized earlier is the stored filter cake on site that can potentially emit radon. The emission rate and factors are described in Section 5.1.2.3.3 and Table G-10 in Appendix G.1. This source was modeled as an area source as presented below:

Source	*Release Height*	*Area (acres)*
1	12 feet	2.38

5.1.2.5.7 Potential Temporary Activities Impact Modeling

There are several activities and processes that may cause temporary air emissions during the operation of the power plant. They include:

- Well rework/new well drilling
- Well flow activities
- Steam vent tanks
- Plant startup

The modeling scenarios necessary to assess their impact to the ambient air quality standards are discussed by pollutant. Only short term scenarios were evaluated for these activities because they are short term events and their duration and frequency can only be assumed.

Particulate Matter

PM_{10} could be emitted from all of the sources listed above. The 24-hour period for PM_{10} was evaluated:

The following parameters were used for these evaluations:

- Well rework/new well drilling were modeled using the same inputs and short term emissions as presented for Section 5.1.2.4.1 and Section 5.1.2.5.5. Only one well/rig was evaluated.
- Well flow activities were modeled using the same inputs and short term emissions as presented in Section 5.1.2.4.2 and Section 5.1.2.5.5.

Steam vent tank releases (i.e., turbine bypass conditions) are expected to occur at the low and standard steam vent tanks and at the cooling towers and DWHs. These emissions are modeled as point sources. Refer to Table G-15 in Appendix G.1.

Steam Vent Tank (low pressure):

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	60 feet	246.1 °F	10 feet	varies

Stack velocities vary by season and by brine throughput at the brine handling facilities. The following values were used:

	Velocity
Summer:	81.5 fps
Annual average:	77.3 fps
Winter:	76.4 fps

Steam Vent Tank (standard pressure):

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	60 feet	298.9 °F	10 feet	varies

Stack velocities vary by season and by brine throughput at the brine handling facilities. The following values were used:

	Velocity
Summer:	68.9 fps
Annual average:	65.5 fps
Winter:	64.7 fps

Cooling Tower:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
20	58 feet	varies	32 feet	33.1 fps

Cooling tower temperatures vary by season and by brine throughput at the brine handling facilities. The following values were used:

	Temperature
Summer:	90.3 °F
Annual average:	72.8 °F
Winter:	63.7 °F

Dilution Water Heaters:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
2	45 feet	213.1 °F	8 feet	varies

Velocities vary by season and by brine throughput at the brine handling facilities. The following values were used:

	Velocity
Summer:	31.9 fps
Annual average:	30.5 fps
Winter:	30.2 fps

In cold plant startup conditions, emissions are expected to occur mainly at the PTU and steam vent tanks. After the first well is warmed up at the PTU, the brine is routed through the plant where the high pressure steam is sent to the turbine bypass, and the low and standard pressure steam is sent to the steam vent tanks while the second well is being brought online at the PTU. When the second well is warmed up, the steam from the two wells (first and second) is routed to the turbine generator system and emissions cease at the steam vent tanks. These emissions are modeled as point sources. Emissions from the cooling towers and DWHs were also considered.

PTU:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	50 feet	226.7 °F	9 feet	40 fps

Cooling Towers:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
20	58 feet	varies	32 feet	33.1 fps

Temperature varies by season and by brine throughput at the brine handling facilities. The following values were used:

	Temperature
Summer:	90.3 °F
Annual average:	72.8 °F
Winter:	63.7 °F

Steam Vent Tank (low pressure):

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	60 feet	246.1 °F	10 feet	varies

Velocities vary by season and by brine throughput at the brine handling facilities. The following values were used:

	Velocity
Summer:	5.71 fps
Annual average:	5.41 fps
Winter:	5.35 fps

Steam Vent Tank (standard pressure):

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
1	60 feet	298.9 °F	10 feet	varies

Velocities vary by season and by brine throughput at the brine handling facilities. The following values were used:

	Velocity
Summer:	4.82 fps
Annual average:	4.59 fps
Winter:	4.53 fps

Dilution Water Heaters:

Source	*Stack Height*	*Stack Temperature*	*Stack Diameter*	*Stack Velocity*
2	45 feet	213.1 °F	8 feet	varies

Velocities vary by season and by brine throughput at the brine handling facilities. The following values were used:

	Velocity
Summer:	2.23 fps
Annual average:	2.14 fps
Winter:	2.11 fps

Refer to Table G-16 in Appendix G.1.

Other Criteria Pollutants

Only one activity is anticipated to emit the other criteria pollutants and that is the rework drilling emissions. The following averaging periods were modeled.

1 hour:	CO, NO_2 and SO_2
3 hour:	SO_2
8 hour:	CO
24 hour:	SO_2

The following parameters were used in these evaluations.

- Well rework was modeled using the same inputs for one source or rig as presented in the PM_{10} evaluation.

Refer to Table G-2 in Appendix G.1.

Hydrogen Sulfide

For H_2S, three potential sources were modeled to determine their impact on the 1 hour standard. The following parameters were used for this evaluation:

- Well flow activities were modeled using the same inputs as presented for the PM_{10} evaluation.

Refer to Table G-14 in Appendix G.1.

- Steam vent tanks were modeled using the same inputs as presented for the PM_{10} evaluation.

Refer to Table G-15 in Appendix G.1.

- Plant startup was modeled using the same inputs as presented for the PM_{10} evaluation.

Refer to Table G-16 in Appendix G.1

5.1.2.5.8 Fumigation Impact Analysis

Shoreline fumigation is the process in which a plume, emitted into a stable marine layer, intersects a thermally unstable layer over land. The plume travels with relatively little diffusion in this stable layer, but upon intersecting the thermally unstable layer over land, fumigation can occur leading to high ground level concentrations.

Internal boundary layers develop near a coastline because of the two basic physical differences between land and water: roughness and temperature. Roughness over the water is generally less than roughness over the land. Frictional effects on air moving over a water surface are minimal and mechanical turbulence produced by varying wave heights is generally low. The mechanical turbulence produced by roughness elements over land may be quite high. Thus, with onshore flow a mechanically forced internal boundary layer develops from the change in shear stress because of the roughness discontinuity present at the shoreline. The roughness internal boundary layer is generally dominated, however, by thermal effects of the surface discontinuity.

A convective internal boundary layer forms because of large differences between land and water temperatures (hence the name thermal internal boundary layer [TIBL]). The formation of the TIBL is based on flow adjustment theory. An airmass advected over a cold lake or ocean surface is not destabilized by convective elements as would an overland airmass. Instead, the marine air mass cools from below via conduction from the cold water's surface and thus becomes stable. As the stable marine layer crosses the shoreline (i.e., onshore flow) it must adjust itself, first in the lowest levels, then in the higher levels, to the resulting discontinuity in temperature between the water and land. This adjustment is accomplished by the generation of turbulence which acts as a transport mechanism for surface heat from the land surface. The TIBL interface generally slopes upward from the coastline until at some point downwind it assumes an equilibrium height, which is the height of the inland mixed layer.

Thus, a distinct change in the air mass can occur at the land-water interface because of two reasons. One is the change in roughness and another is the change in surface heating because of the difference in surface temperature between land and water.

It is unlikely that the physical and dynamical processes needed for shoreline fumigation exist in the land-water interface of the Salton Sea. The area surrounding the Salton Sea is classified as desert. Any airmass advected over the Salton Sea already has desert characteristics to begin with. Furthermore, the Salton Sea is not a large water body as compared to the land mass completely surrounding it, nor is it considered a cold mass of water. Typically, air masses advected over cold water surfaces need large amounts of time and distance to acquire a stable marine characteristic. Given the limited size of the water body, and the fact that the Salton Sea is not considered a cold body of water, it is doubtful that a desert air mass will become a stable marine layer as it is transported over the Salton Sea.

Another missing element needed for the formation of shoreline fumigation is the large difference in roughness length between the water and land. The project is in flat desert terrain, which is somewhat similar to the roughness length over water.

For the reasons given above, the needed physical processes for the generation of a stable marine layer don't exist in the project area. Shoreline fumigation is not expected to occur in this desert climate because the Salton Sea lacks the size or temperature structure needed to form such a stable marine layer. Inversion breakup fumigation impacts were considered using the latest U.S. EPA release of SCREEN3 (version 96043). Fumigation impacts for the cooling tower cells, water heaters, and emergency generator 4160 were predicted to occur at 5224, 3440, and 2708 meters from each respective source. No fumigation was predicted to occur by SCREEN3 for emergency generator 480 or the fire pump because of their shorter plume heights. The modeled 1 hour fumigation impacts for each of the three individual sources were compared to the maximum impacts determined in the ISCST3 analyses. Fumigation impacts were less than the ISCST3 maximums. Therefore, fumigation will not significantly affect the overall results of the modeling analyses. Refer to Table G-20 in Appendix G.2 for additional information.

5.1.2.6 Compliance With Ambient Air Quality Standards

This section presents the results of the modeling runs described in the previous section and adds the results to the expected background levels described in Section 5.1.1.4. The sum of these concentrations is then compared to the current California and federal ambient air quality standards.

5.1.2.6.1 Particulate Matter

Construction Modeling Results

Four types of activities are anticipated to emit PM_{10} during construction. The impact from each is listed along with the combined impact. Plant commissioning is listed separately in Table 5.1-40 and only for the 24 hour averaging period because of the brief period of emissions. Scenario #1 of the three scenarios generated the highest concentrations. Scenario #1 consists of one well venting at the PTU and seven wells emitting at the steam vent tanks. Fugitive dust, well drilling, construction equipment, well flow testing and combined (and plant commissioning for 24-hour) sources were modeled and the highest 24 hour and annual PM_{10} concentrations are listed in Tables 5.1-38 and 5.1-39.

Refer to Tables G-21 and G-22 in Appendix G.2.

Impacts from well drilling, construction equipment and well flow testing are not expected, in and of themselves, to exceed the California and the federal 24-hour standard. Additionally, emissions from plant commissioning are not expected, in and of themselves, to exceed the California and the federal 24-hour standard. Activities resulting in fugitive dust emissions exceed the California standard by a factor of 1.4. Annually, construction activities by themselves do not exceed the California and the federal PM_{10} standards. An 80 percent level of control has been assumed with the proposed fugitive mitigation plan based on U.S. EPA referenced levels. Recent vendor information has indicated possible higher control levels. At these potentially higher control levels, impacts could be below the California PM_{10} standard. Refer to the vendor fugitive dust information in Appendix G.3.

Operations Modeling Results

Nine activities or categories of devices are anticipated to emit PM_{10} during plant operations. Silica filter cake handling, sulfur filter cake handling, cooling towers drift, dilution water heaters, emergency generators (480 and 4160), fire pump, operations and maintenance equipment exhausts, operations and maintenance dust and combined sources were modeled and the highest 24-hour and annual PM_{10} concentrations are listed in Tables 5.1-41, 5.1-42, and 5.1-43.

Refer to Table G-23 in Appendix G.2.

The calculated impacts from operations are below the federal ambient impact significance levels. Therefore, the emissions from operations are not expected to contribute to exceedances of the California and federal ambient air quality standards.

Modeling Results for Temporary Activities

Four activities are anticipated to emit PM_{10} temporarily. Well rework, well flow, steam vent tank releases and plant startup sources were modeled and the highest 24-hour PM_{10} concentrations are listed in Tables 5.1-44 and 5.1-45.

Refer to Table G-24 in Appendix G.2.

Impacts from temporary activities are not expected, in themselves, to exceed the California and federal PM_{10} standards.

5.1.2.6.2 Hydrogen Sulfide

Construction Modeling Results

One activity, well flow testing, is anticipated to emit H_2S during the construction period. H_2S will also be emitted during the commissioning period. Scenario #3a, low pressure steam blow, generated the highest concentrations of all the various scenarios. Well flow testing and plant commissioning (#3a) were modeled and the highest 1-hour H_2S concentrations are listed in Tables 5.1-46 and 5.1-47.

Construction well flow testing does not, in itself, exceed the California 1-hour standard. Peak plant commissioning emissions exceed the California 1-hour H_2S standard by a factor of 3.5. This condition exists for 24 hours. Plant commissioning activities are anticipated to last about 14 days.

Operations Modeling Results

Two categories of devices are anticipated to emit H_2S during plant operations. Cooling towers and dilution water heaters were modeled and the highest 1-hour H_2S concentrations are listed in Tables 5.1-48 and 5.1-49.

Impacts from operations are expected to meet the California 1-hour H_2S standard.

Modeling Results for Temporary Activities

Three activities are anticipated to emit H_2S intermittently. Well flow, steam vent tanks and plant start up were modeled and the highest 1-hour H_2S concentrations are listed in Tables 5.1-50 and 5.1-51.

Impacts from temporary activities, in and of themselves, do not exceed the California 1-hour standard.

5.1.2.6.3 Nitrogen Dioxide

Construction Modeling Results

Two categories of sources are anticipated to emit NO_2 during construction. Well drilling and construction equipment sources were modeled and the highest 1-hour and annual NO_2 concentrations are listed in Tables 5.1-52 and 5.1-53.

The ozone limiting method (ISCST-OLM) was used for the 1-hour concentrations. Refer to Table G-29 in Appendix G.2 for a listing of these results. The ambient ratio method (factor 0.75) for rural areas was used for annual concentrations. Refer to Table G-30 for a listing of these results.

Impacts from construction activities (Table 5.1-54), in and of themselves, are not expected to exceed the California 1-hour standard or the federal annual standard. Combined with a conservative estimate of background values, the 1-hour California standard is exceeded by 6.6 percent. This calculated exceedance is more of an artifact of the conservative background levels (NO_2 and ozone) used in the analysis.

Operations Modeling Results

Four sources are anticipated to emit NO_2 during plant operations. Emergency generator (480 and 4160), fire pump, and operations and maintenance equipment were modeled and the highest 1-hour and combined NO_2 concentrations are listed in Tables 5.1-55 and 5.1-56. Only one diesel engine is listed in the 1-hour modeling runs because the other two will not be tested while the original one is tested. A screening analysis indicated that the fire pump engine generated the highest concentrations.

Ambient ratio method (factor 0.75) for rural areas was used for annual concentrations. Refer to Table G-32 for a listing of these results.

Impacts from operations (Table 5.1-57) are not expected to exceed the California 1-hour standard or the federal annual standard. The high total value is more of an artifact because of the conservative background levels (NO_2 and ozone) used in the analysis.

Modeling Results for Temporary Activities

One activity, well reworking, is anticipated to emit NO_2 temporarily.

The highest 1-hour NO_2 concentrations associated with well reworking are listed in Table 5.1-58.

Impacts from well reworking activities (Table 5.1-59) are not expected to exceed the California 1-hour standard. The high total value is more of an artifact because of the conservative background levels (NO_2 and ozone) used in the analysis.

5.1.2.6.4 Carbon Monoxide

Construction Modeling Results

Two sources are anticipated to emit CO during construction. Well drilling, construction equipment and combined sources were modeled and the highest 1-hour and 8-hour CO concentrations are listed in Tables 5.1-60 and 5.1-61.

Impacts from construction activities (Table 5.1-62) are not expected to exceed the 1-hour and 8-hour standards. Impacts are below the federal ambient impact significance levels.

Operations Modeling Results

Four sources are anticipated to emit CO during plant operations. Emergency generators (480 and 4160), fire pump, and operations and maintenance equipment were modeled and the highest 1-hour and 8-hour CO concentrations are listed in Tables 5.1-63 and 5.1-64.

Impacts from operations (Table 5.1-65) are not expected to exceed the 1-hour or 8-hour standards.

Modeling Results for Temporary Activities

One activity is anticipated to emit CO temporarily. Well reworking was modeled and the highest 1-hour and 8-hour CO concentrations are listed in Tables 5.1-66 and 5.1-67.

Impacts from temporary activities (Table 5.1-68) are not expected to exceed the 1-hour or 8-hour standards. Impacts are below the federal ambient impact significance levels.

5.1.2.6.5 Sulfur Dioxide

Construction Modeling Results

Two activities are anticipated to emit SO_2 during construction. Well drilling and construction equipment were modeled and the highest 1-hour, 3-hour, 24-hour and annual SO_2 concentrations are listed in Tables 5.1-69, 5.1-70, 5.1-71 and 5.1-72.

Impacts from construction activities (Table 5.1-73) are not expected to exceed the 1-hour, 3-hour, 24-hour or annual standards. Maximum concentrations are below the ambient federal impact significance levels for all averaging periods except 24-hour. The 24-hour impact is slightly above the significance level.

Operations Modeling Results

Four sources are anticipated to emit SO_2 during plant operations. Emergency generator (480 and 4160), fire pump, and operations and maintenance equipment were modeled and the highest 1-hour, 3-hour, 24-hour and annual SO_2 concentrations are listed in Tables 5.1-74, 5.1-75, 5.1-76 and 5.1-77.

Impacts from operations (Table 5.1-78) are not expected to exceed the 1-hour, 3-hour, 24-hour or annual standards. Maximum concentrations are below the ambient federal impact significance levels for all averaging periods except 24-hour. The 24-hour impact is slightly above the significance level.

Modeling Results for Temporary Activities

One activity is anticipated to emit SO_2 temporarily. Well reworking was modeled and the highest 1-hour, 3-hour and 24-hour SO_2 concentrations are listed in Tables 5.1-79, 5.1-80, and 5.1-81.

Impacts from temporary activities (Table 5.1-82) are not expected to exceed the 1-hour, 3-hour, or 24-hour standards. Maximum concentrations are below the ambient impact significance levels for all averaging periods except 24-hour. The 24-hour impact is slightly above the significance level.

5.1.2.6.6 Airborne Lead

Construction Modeling Results

Only one activity is anticipated to emit airborne lead during construction. Well flow testing was modeled and the highest monthly airborne lead concentrations are listed in Table 5.1-83.

Impacts from construction activities (Table 5.1-84) are not expected to exceed the California or federal standards.

Operations Modeling Results

Three activities are anticipated to emit airborne lead during plant operations. Filter cake handling, cooling tower drift, and dilution water heater sources were modeled and the highest monthly airborne lead concentrations are listed in Table 5.1-85.

Impacts from operations (Table 5.1-86) are not expected to exceed California or federal standards.

Modeling Results for Temporary Activities

Two activities are anticipated to emit airborne lead temporarily. Well flow and steam vent tanks were modeled and the highest monthly airborne lead concentrations are listed in Table 5.1-87.

Impacts from temporary activities (Table 5.1-88) are not expected to exceed the California or federal standards.

5.1.2.7 Other Impacts on Air Quality

5.1.2.7.1 Health Risk

The previous sections outline the scenarios for modeling the various sources at the SSU6 Project that were conducted for the public health risk assessment. This information was used as a basis for determining the health risk impacts of the project as discussed in detail in Section 5.15, *Public Health*.

5.1.2.7.2 Visibility

Class I Impact Analysis (Prevention of Significant Deterioration [PSD])

Although typically only included as part of a PSD permit application, air quality modeling analyses were performed of increment consumption and impacts to Air Quality Related Values (AQRV) in the nearest Class I area. Joshua Tree National Park is 56.2 to 126.5 kilometers (km) northwest to north-northeast (318° to 17°) from the closest portion of the SSU6 Project (well pad OB1/N). Impacts were quantified using the CALPUFF Modeling System operated in a screening mode. The modeling followed guidance provided by the Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report (U.S. Forest Service et al., 2000), the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report, and the Guidance on Nitrogen Deposition Analysis Thresholds criteria document.

CALPUFF, used in a screening mode, was used to assess the potential impacts of the SSU6 Project on air quality concentrations, visibility, and deposition rates for nitrogen- and sulfur-containing species. When CALPUFF is operated in a screening mode, a homogeneous wind-field is assumed for the entire modeling domain. Three receptor arcs centered on the closest portion of the project (well pad OB1 at 628.357 km East and 3671.134 km North in UTM Zone 11) were created to quantify impacts: one arc representing the nearest Class I area boundary (56.2 km), one arc for the middle of the Class I area (91.4 km), and one arc at the furthest Class I area boundary distance (126.5 km). Each arc consisted of receptors equally spaced 1° apart and extending an additional 45° from the directions that bound the Class I area for the source location (273° to 62°). Receptor elevations were modeled as both 500 and 1250 meters above mean sea level, which represents the lowest and highest portions of the Class I area, respectively. Because the Salton Sea sources are at an elevation of approximately 70 meters below mean sea level, the sources were modeled with a zero elevation and the receptors at elevations of 570 and 1320 meters (maximum impacts were identical for either elevation). Reported concentrations are the maximum model-predicted impacts anywhere within the modeled arcs.

The surface data required by CALPUFF for screening analyses includes pressure, relative humidity, precipitation, and horizontal global radiation data, which are available for 1961 through 1990 on the NCDC Solar and Meteorological Surface Observation Network (SAMSON) CD dataset. The nearest appropriate SAMSON surface station to the project is Daggett/Barstow Airport, at 34.85° North latitude and 116.78° West longitude in Time Zone 8 (Pacific Standard Time [PST]). All of the recent data before 1988 were missing around seven hours of data each day from about 11 pm until about 6 am. Therefore, only three years of surface data (i.e., 1988 to 1990) were used for the modeling analyses with CALPUFF in screening mode (i.e., single station of surface data). Concurrent mixing heights from Desert Rock, Nevada were also used. The extended ISCST3 meteorological dataset was generated with PCRAMMET using wet deposition and precipitation data options. The Daggett anemometer height is 20 feet (April 12, 2002 telephone conversation with Janet Wall, NCDC, 828/271-4800).

CALPUFF is capable of simulating the chemical transformation of pollutants which contribute to regional haze and atmospheric deposition such as the transformation of sulfur dioxide to ammonium sulfate – a fine particle which effectively scatters light, thereby increasing haze. CALPUFF requires the user to provide background concentrations of other pollutants (e.g., ozone and ammonia), which participate in the chemical reactions to accurately quantify the impacts. For ozone, an average concentration of 40 ppb was used and, for ammonia (NH_3), a domain average value of 10.0 ppb was used (grassland regions).

A CALPUFF control file was used which included IWAQM recommended defaults (U.S. EPA, 1998) for the model options. This included rural dispersion coefficients, default wind speed profile exponents, and default vertical potential temperature gradient. A brief summary of the options used in the modeling analysis are listed below:

- Number of X grid cells = 2
- Number of Y grid cells = 2
- Number of vertical layers = 1
- Grid origin = 448 km East and 3491 km North in UTM Zone 11
- Grid spacing = 180 km
- Cell face heights = 0 and 6500 meters
- Minimum mixing height = 20 meters
- Maximum mixing height = 6500 meters (based on observational data)
- Minimum wind speed for non-calm conditions = 0.5 m/s
- Vertical distribution used in the near field = Gaussian
- Terrain adjustment method = partial plume path adjustment
- No puff splitting allowed
- Chemical mechanism = MESOPUFF-II
- Wet and dry removal modeled
- Dispersion coefficients = PG dispersion coefficients
- PG sigma-y and z not adjusted for roughness
- Partial plume penetration of elevated inversion allowed
- Lateral turbulence not used

The computational grid used extended 50 kilometers beyond the furthest receptor point. The maximum concentration for each pollutant averaging time modeled was compared with the appropriate AQRV. CALPOST options include the formation of hygroscopic species based on f(rh) values and background concentrations of hygroscopic and non-hygroscopic species as presented for Joshua Tree National Park in the FLAG Phase I report (U.S. Forest Service et al., 2000). Maximum hourly relative humidity was limited to 98 percent. CALPUFF values of light extinction were calculated for a 24-hour averaging period while CALPUFF predicted values of deposition were calculated for annual periods (8760 hours). CALPUFF predicted concentrations of PSD criteria pollutants SO_2, NO_2, and PM_{10} were calculated using the applicable averaging time (SO_2 = 3, 24, and 8760 hours; NO_2 = 8760 hours; and PM_{10} = 24 and 8760 hours). Other options used in the POSTUTIL and CALPOST post-processing programs are described below for the appropriate AQRV. Maximum operating emission rates and source characteristics (point, area, and volume sources) used in the ISCST modeling were used in the CALPUFF modeling.

Class I Increments (PSD)

Maximum concentrations predicted by CALPUFF are shown on Table 5.1-89 for the PSD increment pollutants. U.S. EPA has established PSD Class I increments for three pollutants: PM_{10}, SO_2, and NO_2. Additionally, U.S. EPA proposed Class I significant impact levels (SILs; 61 FR 38292, July 23, 1996) for these same pollutants. The maximum predicted concentrations are less than 1 percent of the PSD Class I increments for all pollutants. Because the maximum impacts are less than the proposed U.S. EPA Class I SILs, no additional multisource modeling analyses (i.e., including other PSD sources) are typically required to demonstrate compliance with the PSD Class I increments.

Class I Air Quality Related Values (PSD)

In addition to an analysis of PSD Class I increments, the applicant must also demonstrate that AQRVs in PSD Class I areas such as scenic vistas (i.e., based on CALPUFF modeled visibility impairment) and sensitive plants and ecosystems (i.e., based on CALPUFF modeled deposition rates of nitrogen- and sulfur-containing species) will not be threatened as a result of the proposed modification. The Federal Land Managers have established AQRV screening thresholds. If the applicant demonstrates that the maximum impacts are less than these screening thresholds, than further analyses would typically not be required. However, should the impacts exceed the screening thresholds, then more refined analysis may be required, depending on the magnitude and frequency of occurrence, as evaluated on a case-by-case basis by the Federal Land Manager.

The CALPUFF-predicted change in light extinction is compared with the FLAG threshold of 5 percent, below which the proposed change is considered insignificant. Additionally, model-predicted nitrogen- and sulfur-containing species deposition rates are compared with the FLAG threshold of 0.005 kilograms per hectare per year (kg/ha-yr), below which the proposed change is considered insignificant.

Model-predicted impacts on air quality related values were quantified using the same model, input data, and model options, as in the PSD Class I increment analysis. Two post-processing utilities, POSTUTIL and CALPOST, were also used as discussed below.

Class I Acid Deposition Fluxes (PSD)

Acid deposition is quantified by modeling the deposition rates of nitrogen- and sulfur-containing species. Emission rates of NO_X, SO_2, and SO_4 were input into CALPUFF, which in turn calculates the deposition rates of secondary species. Table 5.1-90 presents the species modeled in the CALPUFF program. Dry and wet flux output files created by CALPUFF were processed in POSTUTIL to obtain a combined total flux output file. In POSTUTIL, nitrogen and sulfur deposition fluxes were computed using a weighted sum of the deposition fluxes of all of the species computed and stored from the CALPUFF model run. Table 5.1-90 includes the weight of nitrogen or sulfur contained in each species modeled in the POSTUTIL program. All of the following contribute to the total nitrogen mass: SO_4 in the form of ammonium sulfate $[(NH_4)_2SO_4]$; NO_X as NO_2; HNO_3; and NO_3 in the form of ammonium nitrate $[(NH_4)NO_3]$. Only SO_2 and SO_4 contribute to the total sulfur mass. The total amount of nitrogen or sulfur that 1 gram of each of the species modeled contributes was calculated using molecular weight ratios.

The resulting output file from the POSTUTIL program was processed in the CALPOST program to obtain total nitrogen and total sulfur deposition rates. A scaling factor was employed which converted the deposition rates from grams per square meter per second (g/m^2-sec) to kg/ha-yr. Table 5.1-91 presents the maximum model-predicted nitrogen and sulfur flux for Joshua Tree National Park. The model-predicted nitrogen and sulfur deposition rates were lower than the FLAG thresholds of 0.005 kg/ha-yr for each compound, applicable in the Western United States. Therefore, the deposition impacts from the proposed modification are not considered significant and additional refined analyses are unnecessary.

Class I Regional Haze Visibility Impairment (PSD)

The CALPOST post-processor was used to quantify the percent change in light extinction from the proposed modification. Because ammonium nitrate and ammonium sulfate particles form as a function of relative humidity a f(rh) is provided into CALPOST to account for this phenomenon. Seasonal f(rh) values documented in the FLAG report for Joshua Tree National Park were used as input. Background concentrations of light scattering and absorbing species must also be provided for CALPOST to calculate the change in light extinction. The FLAG document provides seasonal values of hygroscopic and non-hygroscopic species for Joshua Tree National Park, which were also used as input into CALPOST. Light extinction is calculated as a 24-hour averaged value.

The maximum model-predicted light extinction (B_{ext}), background light extinction, and percent change in light extinction are presented in Table 5.1-92. The maximum predicted change in light extinction is 2.87 percent, which is less than the 5 percent screening threshold. Therefore, the proposed modification does not pose a threat to regional haze at Joshua Tree National Park.

5.1.2.7.3 Secondary Pollutant Impacts

Ozone Impacts

The SSU6 Project's gaseous pollutants, especially NO_X and VOC can potentially contribute to the formation of ozone. Total NO_X annual emissions are expected to be below 5.8 tons per year, and VOC emissions below 1.4 tons per year. At these expected emissions rates, the overall ozone impact for SSU6 Project is expected to be insignificant.

Secondary PM_{10} Impacts

The SSU6 Project's gaseous pollutants, especially VOC, SO_2, NH_3, and NO_X can potentially contribute to the formation of a secondary particulate matter. For VOC, most of the emissions of 1.4 tons per year are benzene (0.8 tons per year), which is not expected to contribute to PM_{10} formation. The remaining portion (0.6 tons per year) is expected to generate an insignificant impact.

For SO_2, potential contribution to the formation of secondary particulate matter, total emissions are expected to be below 0.5 tons per year. Again, at these rates, SO_2 conversion to sulfate/particulate matter is anticipated to generate an insignificant impact.

With regard to ammonia nitrates, studies have indicated a conversion of NO_X to nitrate of approximately 10 to 30 percent per hour in a polluted environment. Based on a 10 percent per hour rate, because the area is not considered a polluted environment, the following analysis was conducted.

Maximum 24-hour NO_X impact was 94 $\mu g/m^3$ (refer to Table G-31) at an average distance of 360 meters from the emission units, date - 990727. Average wind speed during that day was 4.91 meters per second. Time to the maximum receptor from the units is approximately 73 seconds. At a 10 percent per hour conversion rate, 0.20 percent of the NO_X is calculated to be converted to particulate matter. PM_{10} impact from ammonia nitrate would therefore be 0.19 $\mu g/m^3$.

These concentrations assume all three of the diesel fired emergency generators and all of the operations and maintenance equipment are also operating for 24 hours straight. A more realistic scenario would have the emissions at 10 to 20 times less (0.02 to 0.01 $\mu g/m^3$ PM_{10} formation).

5.1.3 Cumulative Impacts

A preliminary review of the cumulative impacts of the SSU6 Project and other projects has been conducted in consultation with the APCD. A project within a 6-mile radius that has received construction permits but is not yet operational is the Salton Sea Mineral Recovery Facility. This facility was built in 1999 and is expected to become operational during 2002. The Mineral Recovery Facility emits the following pollutants.

- Sulfuric Acid Mist (SAM)
- VOCs
- PM_{10}

The Mineral Recovery Facility controls its PM_{10} point source emissions with baghouses and has an emission limit total of 0.145 lb/hr of PM_{10}. Dispersion modeling conducted as part of the application for the Mineral Recovery Facility shows maximum ambient impacts of 0.95 $\mu g/m^3$ (24-hour averaging period) and impacts of 0.18 $\mu g/m^3$ (annual averaging period) (Salton Sea Mineral Recovery, 1997). These levels are below the federal significance levels in assessing the contribution to any exceedance of an ambient air quality standard. Nonetheless, a modeling review was conducted to assess the combined PM_{10} effects. Tables 5.1-93 and 5.1-94 list the results.

The results show that there is no significant additive impact for the two facilities. Additionally, on an individual and combined basis, the impacts are below the federal significance levels.

There is one project in the permitting phase (IID Water Conservation and Transfer Project) that has the potential to have an indirect air quality impact in the area. One of the potential results of this project is a decrease in the Salton Sea level and a concurrent increase in the exposed shoreline area. This effect would increase the potential for windblown dust (PM_{10} emissions). Only a conservative qualitative assessment of this potential indirect effect has been conducted in the EIR/EIS prepared for the project. Based on this assessment, windblown dust from the exposed shoreline was identified as having a significant air quality impact. Alternatives have been identified for the IID Project that avoid these significant impacts. Because the PM_{10} impacts of the SSU6 Project are below the federal air quality significance levels, the cumulative PM_{10} impacts of the SSU6 Project are also expected to be below significance even when added to the IID Project.

5.1.4 Mitigation Measures

This section reviews the mitigation measures proposed by the Applicant to reduce the project's impacts to air quality. These measures ensure that:

- The Project does not conflict with or obstruct implementation of the Imperial County Air Quality Attainment Plan.
- The Project does not violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- The Project does not result in a net increase of PM_{10} for which the project region is non-attainment.
- The Project does not expose sensitive receptors to substantial pollutant concentrations.
- The Project does not create objectionable odors affecting a substantial number of people.

5.1.4.1 Fugitive Dust

The Imperial County APCD has adopted Rule 800, *Fugitive Dust Requirements for Control of Fine Particulate Matter (PM_{10})*. This rule contains reasonably available control measures to minimize fugitive emissions. This rule covers the following activities and lists control measures available.

- Unpaved Roads/Haul and Access
- Bulk Material Handling
- Material Transport/Haul Trucks
- Track Out/Carry Out

The Applicant is proposing the following fugitive dust suppression program to reduce construction and operations related emissions.

5.1.4.1.1 Unpaved Roads/Haul and Access

Construction Activities

- Frequent watering of unpaved roads and disturbed areas (at least twice a day).
- Limit speed of vehicles in construction areas to no more than 10 miles per hour.
- Increase frequency of watering when wind speeds exceed 15 miles per hour.

Operation Activities

- Pave all access and internal power plant roads with asphalt.
- Limit vehicle speeds and water unpaved access roads to well pads.

5.1.4.1.2 Bulk Material Handling

Construction Activities

- Install windbreaks at the windward sides on construction areas prior to the soil being disturbed. The windbreaks shall remain in place until the soil is stabilized or permanently covered.
- Pre-wet the soil to be excavated during construction.
- Spray with water 15 minutes prior to handling.

Operation Activities

- Direct load of haul truck with recently dewatered filter cake.
- Use wind break shield or structure at filter cake discharge point.

5.1.4.1.3 Material Transport/Haul Trucks

Construction Activities

- Cover all trucks hauling dirt, sand, soil or other loose materials and maintain at least 6 inches of freeboard between the top of the load and the top of the trailer.
- Cargo compartments will be maintained so that no spillage or loss or material can occur.
- Cargo compartments for all haul trucks will be cleaned at delivery site after removal of material.

Operation Activities

- Cover all trucks hauling filter cake or other geothermal materials and maintain at least 6 inches of freeboard between the top of the load and the top of the trailer.
- Cargo compartments will be maintained so that no spillage or loss or material can occur.
- Cargo compartments for all haul trucks will be cleaned at delivery site after removal of material.

5.1.4.1.4 Track Out/Carry Out

Construction Activities

- Employ tire cleaning and gravel ramps prior to entering a public roadway to limit accumulated mud and dirt deposited on the roads.
- Rapid cleanup, within 48 hours of spillage and material tracked out or carried out into a paved road surface.
- Employ dust sweeping vehicles at least twice a day to sweep public roadways that are used by construction and worker vehicles.

- Sweep newly paved roads at least twice weekly.

Operations Activities

- Employ tire cleaning or gravel ramps prior to entering a public roadway to limit accumulated mud and dirt deposited on the roads.
- Rapid cleanup, within 48 hours of spillage and material tracked out or carried out into a paved road surface.

The Applicant also proposes the following mitigation activities so that collectively, with the measures listed, the overall emissions from unpaved roads will be reduced by 80 percent:

- Designate a person to oversee the implementation of the fugitive dust control program.
- Treat the entrance roadways to the construction site with soil stabilization compounds.
- Place sandbags adjacent to roadways to prevent run-off to public roadways.
- Limit on equipment idle times (no more than five minutes).
- Employ electric motors for construction equipment when feasible.
- Apply covers or dust suppressants to soil storage piles and disturbed areas that remain inactive for over two weeks.
- Replace ground cover in disturbed areas as quickly as possible.

5.1.4.2 Well Drilling Construction Emissions

Well drilling activities will be conducted by contractors hired by the Applicant. The contractors will be required to have Statewide Portable Equipment Registrations (SPER) issued by CARB or be permitted by the APCD for their diesel fueled engines. Typical SPER requirements for these types of engines have included being equipped with turbocharger and aftercoolers. Other requirements have included limits on opacity (maintaining below 20 percent), particulate matter emissions to less than 0.1 grain per DSCF corrected to 12 percent carbon dioxide, and a limitation on fuel use per district.

5.1.4.3 Construction Equipment Emissions

The Applicant proposes the following mitigation measures to control exhaust emissions from heavy duty diesel construction equipment.

Exhaust Emissions Control Program (Heavy Duty Diesel Construction Equipment)

- Limit engine idle time to less than 5 minutes and shutdown equipment when not in use.
- Perform regular preventative maintenance to reduce engine problems.
- Use CARB Low Sulfur fuel for all heavy construction equipment.

5.1.4.4 Well Flow Testing Emissions

The brine from a flow test is routed to a well test unit. This unit is designed to minimize the release of entrained brine, which contributes to the particulate matter and metals released. All of the noncondensible gases contained in the brine are assumed released. Other mitigation measures will also be employed, including limiting the flow rate to 1,200,000 lb/hr and the length of a flow test to less than 96 hours.

5.1.4.5 Cooling Towers Emissions

5.1.4.5.1 Noncondensible Gases

The Applicant is proposing the use of LO-CAT System for the control of hydrogen sulfide. This technology has been used at other geothermal facilities and has proven to be a reliable and efficient means of controlling hydrogen sulfide. Information regarding the LO-CAT System is presented in Appendix G.3. The Applicant proposes a control efficiency of 99.5 percent.

Additionally, the Applicant proposes to use the carbon adsorbers to control the emissions of benzene. The Applicant proposes a control efficiency of 95 percent. Information regarding the carbon absorbers is presented in Appendix G.3.

5.1.4.5.2 Offgassing

The Applicant proposes to install oxidizers at the cooling towers to minimize the offgassing of hydrogen sulfide from the condensate. The oxidizers will be designed to oxidize at least 95 percent of the hydrogen sulfide in the condensate.

5.1.4.5.3 Drift

The Applicant proposes to design and build the cooling towers such that the eliminator drift rate does not exceed 0.0006 percent. The Applicant proposes not to use hexavalent chromium containing compounds in the circulating water.

5.1.4.6 Dilution Water Heaters

The Applicant proposes to control the potential emissions from the dilution water heaters by effective design which minimizes the resultant emissions.

5.1.4.7 Filter Cake Handling

The Applicant proposes to control the potential fugitive emissions of particulate matter by minimizing the handling of the filter cake. The filter cake is direct loaded into trucks trailers or bins as it is generated. After loading, the trailers or bins are tarped. The Applicant also proposes the use of sulfate scale inhibitors to minimize the levels of radioactivity from Ra226 and Ra228 in the silica filter cake. Inhibiting radium also inhibits the generation of radon from the silica filter cake.

5.1.4.8 Emergency Generators/Fire Pump

The Applicant proposes to have the internal combustion engines equipped with turbochargers and aftercoolers. Emergency generators will meet the latest BACT for NO_X emissions of 6.9 grams per bhp. Sulfur in the fuel will be limited to less than 0.05 percent.

5.1.4.9 Operating and Maintenance Equipment

The Applicant proposes to have equipment that meets any applicable road or non-road 2001 emissions standards and maintain the equipment with manufacturers recommended procedures.

5.1.4.10 Potential Temporary Emissions

The Applicant proposes to minimize, to the greatest extent possible, the operation of temporary emission sources.

5.1.5 Laws, Ordinances, Regulations, and Standards (LORS)

Air quality LORS are discussed in this section. The applicable LORS are also summarized in Table 5.1-95. This table also identifies the specific sections of the AFC that demonstrate compliance with the indicated LORS.

5.1.5.1 Federal

5.1.5.1.1 Federal Laws

Since 1955, the United States Congress has been promulgating a series of laws governing various aspects of air quality. The most recent amendment of the Clean Air Act occurred in 1990. These statutes are included in Title 42 of the United States Code, Chapter 85, *Air Pollution Prevention and Control*, § 7401 et seq. An important aspect of these acts, especially the early acts, was the establishment of the U.S. EPA and its authority to implement and enforce the Clean Air Act.

5.1.5.1.2 Federal Regulations

The U.S. EPA, under the authority of the Clean Air Act, has promulgated a comprehensive set of regulations implementing the many provisions of the Clean Air Act. These regulations are listed under Title 40 CFR, Subchapter C, *Air Programs* (Parts 50 through 99). Each is discussed below.

PART 50 – NATIONAL PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS (NAAQS). This part establishes the ambient air quality standards for sulfur dioxide, PM_{10}, carbon monoxide, ozone, nitrogen dioxide and lead. The project will be required to show that it does not cause or contribute to an exceedance of these standards as defined in Part 51. Administering agency: APCD with Region IX oversight.

PART 51 – REQUIREMENTS FOR PREPARATION, ADOPTION AND SUBMITTAL OF IMPLEMENTATION PLANS. This part establishes the procedures that delegated agencies must use to maintain compliance with the NAAQS or, in areas that exceed the NAAQS, control strategies to achieve compliance with the NAAQS. Pertinent to the project are the requirements of preconstruction review and permitting of new or modified stationary sources. Two major programs have been developed: Prevention of Significant Deterioration (PSD) and New Source Review (NSR). The PSD program does not apply to the project because its emissions are below the regulatory thresholds. The NSR aspects are an applicable LORS. Administering agency: APCD with Region IX oversight.

PART 52 – APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS. This part lists some of the actual elements of California's Implementation Plan. See Part 51 for discussion. Administering agency: APCD with Region IX oversight.

PART 53 – AMBIENT AIR MONITORING REFERENCE AND EQUIVALENT METHODS, not applicable (administrative)

PART 54 – PRIOR NOTICE OF CITIZENS SUITS, not applicable (administrative)

PART 55 – OUTER CONTINENTAL SHELF AIR REGULATIONS, not applicable

PART 56 – REGIONAL CONSISTENCY, not applicable (administrative)

PART 57 – PRIMARY NONFERROUS SMELTER ORDERS, not applicable

PART 58 – AMBIENT AIR QUALITY SURVEILLANCE, not applicable (administrative)

PART 59 – NATIONAL VOLATILE ORGANIC COMPOUND EMISSION STANDARDS, not applicable

PART 60 – STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES. This part is not an applicable LORS because the project is not a listed source category governed by the Part.

PART 61 – NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS. This part is not an applicable LORS because the project is not a listed source category governed by the Part.

PART 62 – APPROVAL AND PROMULGATION OF STATE PLANS FOR DESIGNATED FACILITIES AND POLLUTANTS, not applicable

PART 63 – NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES. This part is not an applicable LORS because the project is not a listed source category governed by the Part.

PART 64 – COMPLIANCE ASSURANCE MONITORING, not applicable

PART 65 – CONSOLIDATED FEDERAL AIR RULE, not applicable (administrative)

PART 66 – ASSESSMENT AND COLLECTION OF NONCOMPLIANCE PENALTIES BY EPA, not applicable (administrative)

PART 67 – EPA APPROVAL OF STATE NONCOMPLIANCE PENALTY PROGRAM, not applicable (administrative)

PART 68 – CHEMICAL ACCIDENT PREVENTION PROVISIONS. This part is not an applicable LORS because the hazardous materials on site do not exceed the thresholds quantities.

PART 69 – SPECIAL EXEMPTIONS FROM REQUIREMENTS OF THE CLEAN AIR ACT, not applicable (administrative)

PART 70 – STATE OPERATING PERMIT PROGRAMS. This part is not an applicable LORS because the project is not a listed source category, nor exceed the emission thresholds.

PART 71 – FEDERAL OPERATING PERMIT PROGRAMS. Refer to discussion in Part 70.

PART 72 – PERMITS REGULATION. This part is not an applicable LORS because the project is not a fossil fuel fired power plant.

PART 73 – SULFUR DIOXIDE ALLOWANCE SYSTEM, not applicable

PART 74 – SULFUR DIOXIDE OPT-INS, not applicable

PART 75 – CONTINUOUS EMISSION MONITORING, not applicable

PART 76 – ACID RAIN NITROGEN OXIDES EMISSION REDUCTION PROGRAM, not applicable

PART 77 – EXCESS EMISSIONS, not applicable

PART 78 – APPEAL PROCEDURES FOR ACID RAIN PROGRAM, not applicable (administrative)

PART 79 – REGISTRATION OF FUELS AND FUEL ADDITIVES, not applicable

PART 80 – REGULATIONS OF FUELS AND FUEL ADDITIVES, not applicable

PART 81 – DESIGNATION OF AREAS FOR AIR QUALITY PLANNING PURPOSES, not applicable (administrative)

PART 82 – PROTECTION OF STRATOSPHERIC OZONE, not applicable

PART 85 – CONTROL OF AIR POLLUTION FROM MOBILE SOURCES, not applicable

PART 86 – CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES, not applicable

PART 87 – CONTROL OF AIR POLLUTION FROM AIRCRAFT AND AIRCRAFT ENGINES, not applicable

PART 88 – CLEAN-FUEL VEHICLES, not applicable

PART 89 – CONTROL OF EMISSIONS FROM NEW AND IN-USE NONROAD COMPRESSION-IGNITION ENGINES, not applicable

PART 90 – CONTROL OF EMISSIONS FROM NONROAD SPARK-IGNITION ENGINES, not applicable

PART 91 – CONTROL OF EMISSIONS FROM MARINE SPARK-IGNITION ENGINES, not applicable

PART 92 – CONTROL OF AIR POLLUTION FROM LOCOMOTIVES AND LOCOMOTIVE ENGINES, not applicable

PART 93 – DETERMINING CONFORMITY OF FEDERAL ACTIONS TO STATE OR FEDERAL IMPLEMENTATION PLANS, not applicable (administrative)

PART 94 – CONTROL OF AIR POLLUTION FROM MARINE COMPRESSION-IGNITION ENGINES, not applicable

PART 95 – MANDATORY PATENT LICENSES, not applicable

PART 96 – NOx BUDGET TRADING PROGRAM FOR STATE IMPLEMENTATION PLANS, not applicable (administrative)

PART 97 – FEDERAL NOx BUDGET TRADING PROGRAM, not applicable (administrative)

The U.S. EPA office of Region IX, in San Francisco, California, administers the Air Program in California.

5.1.5.2 State

5.1.5.2.1 State Laws

The California State Legislature has promulgated various laws governing all aspects of air quality. These laws are listed in the following California Code Titles:

Health and Safety Code – Division 26 – Air Resources

Health and Safety Code – Division 20 – Chapter 6.6, *Safe Drinking Water Act of 1986*

Health and Safety Code – Division 104 – Article 18, *Radionuclide Air Contaminants*

Public Resources Code – Division 13 – California Environmental Quality Act (CEQA)

Public Resources Code – Division 15 – Energy Conservation and Development – Warren Alquist Act

These laws charged CARB with coordinating efforts to attain and maintain ambient air quality standards, especially with regard to vehicular emissions and other statewide air quality issues. The APCDs were given primary responsibility for control of air pollution from all sources other than vehicular. The California Department of Health Services (DHS) was given authority to regulate radioactive materials. The CEC was given authority to implement the Warren Alquist Act. All

State, Regional and Local agencies are charged with assessing projects in conformance with the procedures detailed in CEQA.

5.1.5.2.2 State Regulations

CARB Regulations

CARB has issued the following regulations in Title 17, California Code of Regulations (CCR), Public Health, Division 3, *Air Resources Board*. This listing does not include regulations of mobile sources and associated aspects listed in CCR, Title 13, *Motor Vehicles Division*.

SUBCHAPTER 1 – ADMINISTRATIVE PROCEDURES, not applicable

SUBCHAPTER 1.25 – ADMINISTRATIVE PROCEDURES—HEARINGS, not applicable

SUBCHAPTER 1.5 – AIR BASINS AND AIR QUALITY STANDARDS. These regulations establish the California Ambient Air Quality Standard and their status in each air basin. Imperial County is in the Salton Sea Air Basin. The pollutants and their status are: Ozone: Nonattainment; Carbon Monoxide: Attainment/Unclassified; Nitrogen Dioxide: Attainment; Sulfur Dioxide: Attainment; PM_{10}: Nonattainment; Sulfates: Attainment; Lead: Attainment; Hydrogen Sulfide: Unclassified; Visibility Reducing Particles: Unclassified. The project will be required to demonstrate that it does not cause or contribute to an exceedance of these standards.

SUBCHAPTER 1.6 – LOCAL AIR POLLUTION CONTROL DISTRICT REGULATIONS, not applicable

SUBCHAPTER 2 – SMOKE MANAGEMENT GUIDELINES FOR AGRICULTURAL AND PRESCRIBED BURNING, not applicable

SUBCHAPTER 2.5 – COMPLIANCE SCHEDULE REGARDING VISIBLE EMISSIONS FROM SPECIFIED VESSELS, not applicable

SUBCHAPTER 2.6 – AIR POLLUTION CONTROL DISTRICT RULES, not applicable

SUBCHAPTER 3 – SUBVENTIONS, not applicable

SUBCHAPTER 3.5 – ACID DEPOSITION FEE PROGRAM, not applicable

SUBCHAPTER 3.6 – AIR TOXICS “HOT SPOTS” FEE REGULATION, not applicable (administrative)

SUBCHAPTER 3.8 – CALIFORNIA CLEAN AIR ACT NONVEHICULAR SOURCE FEE REGULATIONS, not applicable (administrative)

SUBCHAPTER 4 – DISCLOSURE OF PUBLIC RECORDS, not applicable

SUBCHAPTER 5 – EMISSION DATA, SAMPLING, AND CREDENTIALS FOR ENTRY, not applicable (administrative)

SUBCHAPTER 5.5 – EQUIPMENT AND PROCESS PRECERTIFICATION, not applicable

SUBCHAPTER 5.6 – INTERCHANGEABLE AIR POLLUTION EMISSION REDUCTION CREDITS, not applicable

SUBCHAPTER 6 – ABRASIVE BLASTING, not applicable

SUBCHAPTER 7 – TOXIC AIR CONTAMINANTS. The project has the potential to emit the following toxic air contaminants: Benzene, Cadmium, Arsenic, Nickel, Lead, and Particulate emissions from diesel fueled engines. The compounds are also listed as Hazardous Air Pollutants (HAP).

SUBCHAPTER 7.5 – AIRBORNE TOXIC CONTROL MEASURES, not applicable

SUBCHAPTER 7.6 – EMISSION INVENTORY CRITERIA AND GUIDELINES. These regulations are an applicable LORS because the project exceeds the regulatory review threshold.

SUBCHAPTER 8 – COMPLIANCE WITH NONVEHICULAR EMISSION STANDARDS, not applicable

SUBCHAPTER 8.5 – CONSUMER PRODUCTS, not applicable

SUBCHAPTER 8.6 – MAXIMUM INCREMENTAL REACTIVITY, not applicable

SUBCHAPTER 9 – CONFLICT OF INTEREST CODE, not applicable

Department of Health Services (State) Regulations

DHS has issued the following regulations regarding air quality issues in Title 17, CCR, Subchapter 4, *Radiation*, Section 30100 et seq.

DIVISION 1, STATE DEPARTMENT OF HEALTH SERVICES (TITLE 17, CCR, SUBCHAPTER 4, RADIATION). These regulations are not applicable to the project because under Section 30180(c)(1), *Exempt Persons, Products, Concentrations and Quantities*, any naturally occurring radioactive material is exempt.

CEC Regulations

The CEC has issued their regulations in Title 20, Public Utilities and Energy, Chapter 5, Site Certification, Sections 1701, et seq. These regulations are applicable to the project, and an Application for Certification is being submitted for the project. The CEC will also review the project under the CEQA Regulations issued in Title 14, Section 15000.

5.1.5.3 Local Regulations

5.1.5.3.1 Local Rules and Regulations

The Imperial County Air Pollution Control District has issued a rule book of regulations governing air quality in Imperial County. Each applicable rule is discussed below:

RULE 100 – RULE CITATION, not applicable

RULE 101 – DEFINITIONS, not applicable

RULE 102 – PUBLIC RECORDS, not applicable

RULE 103 – INSPECTION OF PUBLIC RECORDS, not applicable

RULE 104 – ADMINISTRATIVE PENALTIES, not applicable

RULE 105 – ENFORCEMENT, not applicable (administrative)

RULE 106 – ABATEMENT, not applicable (administrative)

RULE 107 – LAND USE, not applicable (administrative)

RULE 108 – INSPECTIONS, not applicable

RULE 109 – SOURCE SAMPLING. This rule outlines the facilities required for source sampling. The Applicant will design the facilities for source sampling as required by the APCD.

RULE 110 – STACK MONITORING. This is not an applicable rule because the project is not a listed source category.

RULE 111 – EQUIPMENT BREAKDOWN. This rule details the requirement necessary in an equipment breakdown situation. The Applicant will comply with these requirements in case of an equipment breakdown situation.

RULE 112 – NOTICE TO COMPLY, not applicable

RULE 113 – CIRCUMVENTION, not applicable

RULE 114 – SEVERABILITY CLAUSE, not applicable

RULE 115 – LEGAL APPLICATION AND INCORPORATION OF OTHER REGULATIONS, not applicable (administrative)

RULE 201 – PERMITS REQUIRED. A permit to operate is required for the project. An application has been submitted to the APCD.

RULE 202 – EXEMPTIONS. This rule lists units that are exempt from permits. (administrative)

RULE 203 – TRANSFER, not applicable

RULE 204 – APPLICATIONS. The rule specifies that the application needs to be filed in the manner and form prescribed by the Air Pollution Control Officer, not applicable, refer to Rule 207 for CEC projects.

RULE 205 – CANCELLATION OF APPLICATIONS. This rule lists conditions where the authority to construct may be cancelled, not applicable.

RULE 206 – PROCESSING OF APPLICATIONS, not applicable (administrative)

RULE 207 – NEW & MODIFIED STATIONARY SOURCE REVIEW. This rule outlines the emission standards, the offset requirements and conditions, the need to meet ambient air quality standards, procedures for power plants under the CEC process, method of emission calculations, and the required air quality analysis. Compliance with this Rule is discussed in detail in Section 5.1.5.3.2.

RULE 208 – PERMIT TO OPERATE. This rule reviews the procedures for issuing a permit to operate, not applicable (administrative).

RULE 209 – IMPLEMENTATION PLANS, not applicable (administrative)

RULE 210 – DENIAL OF APPLICATION, not applicable (administrative)

RULE 211 – APPEALS, not applicable

RULE 212 – ANNUAL RENEWAL, not applicable (administrative)

RULE 213 – TEMPORARY PERMIT TO OPERATE, not applicable

RULE 214 – EMISSION REDUCTION CREDIT BANKING, not applicable

RULE 215 – COMMUNITY BANK & PRIORITY RESERVE, not applicable

RULE 216 – CONSTRUCTION OR RECONSTRUCTION OF MAJOR STATIONARY SOURCES THAT EMIT HAZARDOUS AIR POLLUTANTS. This rule is not an applicable to the project because the emissions proposed are below the regulatory thresholds.

RULE 301 – PERMIT FEES, not applicable (administrative)

RULE 302 – FEE SCHEDULES, not applicable (administrative)

RULE 303 – ANALYSIS FEES, not applicable

RULE 304 – TECHNICAL REPORTS, not applicable

RULE 305 – HEARING BOARD FEES, not applicable

RULE 306 – AGRICULTURAL BURNING PERMIT FEES, not applicable

RULE 307 – LIVESTOCK FEED YARD FEES, not applicable

RULE 309 – AIR TOXIC "HOT SPOTS" INFORMATION AND ASSESSMENT. This rule applies , the Applicant will comply with all testing and fee requirements.

RULE 400 – FUEL BURNING EQUIPMENT – OXIDES OF NITROGEN. This rule applies to emissions of nitrogen oxides from fuel burning equipment. This Rule is discussed in detail in Section 5.1.5.3.2.

RULE 401 – OPACITY OF EMISSIONS. This rule applies to the opacity of discharges from any single source. The Applicant will comply with this rule with the proposed mitigation measures in Section 5.1.4.

RULE 403 – GENERAL LIMITATIONS ON THE DISCHARGE OF AIR CONTAMINANTS. This rule applies to emissions of particulate matter from any single unit. This Rule is discussed in detail in Section 5.1.5.3.2.

RULE 405 – SULFUR COMPOUNDS EMISSION STANDARDS, LIMITATIONS AND PROHIBITIONS. This rule applies to emissions of sulfur compounds from any single source of emissions. Compliance with this Rule is discussed in detail in Section 5.1.5.3.2.

RULE 407 – NUISANCES. This rule apples to emissions of contaminants that could cause a nuisance to the public. The Applicant will comply with this rule with the proposed mitigation measures in Section 5.1.4.

RULE 408 – FROST PROTECTION, not applicable

RULE 409 – INCINERATORS, not applicable

RULE 412 – SOIL DECONTAMINATION OPERATIONS, not applicable

RULE 413 – ORGANIC SOLVENT DEGREASING OPERATIONS, not applicable

RULE 414 – STORAGE OF REACTIVE ORGANIC COMPOUND LIQUIDS, not applicable

RULE 415 – TRANSFER AND STORAGE OF GASOLINE, not applicable

RULE 416 – OIL-EFFLUENT WATER SEPARATORS, not applicable

RULE 417 – ORGANIC SOLVENTS, not applicable

RULE 418 – DISPOSAL AND EVAPORATION OF SOLVENTS, not applicable

RULE 419 – REDUCTION OF ANIMAL MATTER, not applicable

RULE 420 – LIVESTOCK FEED YARDS, not applicable

RULE 421 – OPEN BURNING, not applicable

RULE 424 – ARCHITECTURAL COATINGS, not applicable

RULE 426 – CUTBACK ASPHALT AND EMULSIFIED PAVING MATERIALS, not applicable

RULE 427 – AUTOMOTIVE REFINISHING OPERATIONS, not applicable

RULE 601 – GENERAL, not applicable

RULE 602 – EPISODE CRITERIA LEVELS, not applicable

RULE 603 – EPISODE STAGES, not applicable

RULE 604 – DIVISION OF RESPONSIBILITY FOR ABATEMENT ACTION, not applicable

RULE 605 – ADMINISTRATION OF EMERGENCY PROGRAM, not applicable

RULE 606 – ADVISORY OF HIGH AIR POLLUTION POTENTIAL, not applicable

RULE 607 – DECLARATION OF EPISODE, not applicable

RULE 608 – EPISODE ACTION STAGE 1 (HEALTH ADVISORY-ALERT), not applicable

RULE 609 – EPISODE ACTION STAGE 2 (WARNING), not applicable

RULE 610 – EPISODE ACTION STAGE 3 (EMERGENCY), not applicable

RULE 611 – EPISODE TERMINATION, not applicable

RULE 612 – STATIONARY SOURCE CURTAILMENT, not applicable

RULE 613 – EPISODE ABATEMENT PLAN, not applicable

RULE 614 – ENFORCEMENT, not applicable

RULE 701 – AGRICULTURAL BURNING, not applicable

RULE 702 – RANGE IMPROVEMENT BURNING, not applicable

RULE 800 – FUGITIVE DUST REQUIREMENT FOR CONTROL OF FINE PARTICULATE MATTER (PM-10). This rule applies to activities that may generate emissions of fugitive dust. This Rule is discussed in detail in Section 5.1.5.3.2.

RULE 900 – PROCEDURES FOR ISSUING PERMITS TO OPERATE FOR SOURCES SUBJECT TO TITLE V OF THE FEDERAL CLEAN AIR ACT AMENDMENTS OF 1990. This is not an applicable rule because the project emissions are below the regulatory thresholds.

RULE 901 – ACID DEPOSITION CONTROL. This is not an applicable rule because the project is not a significant source of NO_2 and SO_2.

RULE 902 – REQUEST FOR SYNTHETIC MINOR SOURCE STATUS, not applicable

RULE 903 – POTENTIAL TO EMIT, not applicable

RULE 910 – ENHANCED MONITORING, not applicable

RULE 925 – GENERAL CONFORMITY, not applicable

RULE 926 – TRANSPORTATION CONFORMITY, not applicable

RULE 1001 – NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP), not applicable

RULE 1002 – CALIFORNIA AIRBORNE TOXIC CONTROL MEASURES (ATCM), not applicable

RULE 1003 – HEXAVALENT CHROMIUM EMISSIONS FROM COOLING TOWERS, not applicable. The project will not be using chromium compounds in the cooling tower.

RULE 1022 – PERCHLOROETHYLENE AIRBORNE TOXIC CONTROL MEASURE—DRY CLEANING OPERATIONS, not applicable

RULE 1101 – NEW SOURCE PERFORMANCE STANDARDS (NSPS), not applicable

Table 5.1-95 summarizes the applicable air quality laws, ordinances, regulations and standards, along with any permits required and their schedule and current status. As shown by the information in this table, the proposed project will trigger the requirements of the NSR program only, and would be included in a single operating permit issued by the APCD. Compliance with the NSR Program (Rule 207) and several other rules are discussed in detail in Section 5.1.5.3.2.

5.1.5.3.2 Detailed Review of APCD Rules

This section describes the compliance of the project with several APCD Rules.

Rule 207, New and Modified Stationary Source Review

BACT Review

The APCD Rules have established potential to emit thresholds that require any new emission unit to apply best available control technology (BACT). Table 5.1-96 presents these thresholds.

The District's Rules further define BACT as,

"For any Emissions Unit the more stringent of:

1. The most effective emission Control Device, emission limit, or technique which has been achieved in practice for such class or category of Source unless the applicant demonstrates to the satisfaction of the Air Pollution Control Officer that such limitations are not achievable.
2. Any other alternative emission Control Device, emission control technique, basic Equipment, fuel, or process determined to be technologically feasible and cost-effective by the Air Pollution Control Officer. Cost-effectiveness analyses shall be performed in accordance with methodology and criteria specified in the Best Available Control Technology Guideline for the South Coast Air Quality Management District, or an alternative methodology and criteria acceptable to the Air Pollution Control Officer.
3. Under no circumstances shall BACT be determined to be less stringent than the emission control required by any applicable provision of laws or regulations of the District, State and Federal government, or the most stringent emissions limitation which is contained in the implementation plan of any State, unless the applicant demonstrates to the satisfaction of the Air Pollution Control Officer that such limitations are not technologically achievable. In no event shall the application of BACT result in the emissions of any pollutant which exceeds the emissions allowed by any applicable New Source Performance Standard (40 CFR, part 60) or National Emission Standard for Hazardous Air Pollutants (40 CFR, part 61)."

The following operating sources were reviewed for applicability to the BACT provisions.

Source/Pollutant		lb/day	BACT Threshold
Cooling Towers (per unit)	PM_{10}	42	25
	H_2S	30	55
	VOC	2.1	25
	Mercury	2.5E-03	0.55
	Lead	6.2E-04	3.3
	Beryllium	7.7E-08	2.2E-03
Dilution Water Heaters (per unit)	PM_{10}	1.6	25
	H_2S	8.1	55
	Mercury	3.6E-03	0.55
	Lead	5.5E-04	3.3
	Beryllium	6.9E-08	2.2E-03

Silica Filter Cake Handling	PM_{10}	0.05	25
	Mercury	1.1E-08	0.55
Emergency Generator (480)*	PM_{10}	0.7	25
	VOC	1.0	25
	NO_X	117	25
	CO	3.2	550
Emergency Generator (4160)*	PM_{10}	16	25
	VOC	20	25
	NO_X	822	25
	CO	53	550
Fire Pump*	PM_{10}	1.1	25
	VOC	1.2	25
	NO_X	87	25
	CO	3.8	550

Note: *Daily emission rate assumes full day of operations.

The PM_{10} from the cooling towers, which is drift, will be controlled with high efficiency drift eliminators rated at 0.0006 percent control. For emergency generators, the current BACT level for NO_X is 6.9 grams per brake horsepower-hour. The Applicant proposes to be below this level for NO_X on both emergency generators and fire pump. These levels were derived from the South Coast AQMD BACT Clearinghouse Database web site for Internal Combustion Engines – Compression Ignition, Emergency.

<u>Offset Review</u>

District Rule 207 states,

"Offsets shall be required for a new or modified Stationary Source with a daily Potential to Emit, calculated pursuant to Subsection E.6., equal to or exceeding the following:

Reactive Organic Compounds	137 lb/day
Nitrogen Oxides	137 lb/day
Sulfur Oxides	137 lb/day
PM_{10}	137 lb/day
Carbon Monoxide (See Sec. C.2.g.)	137 lb/day"

Based on the total operating emissions annually (refer to Table 5.1-32), none of the above thresholds is exceeded; therfore, offsets are not anticipated to be required for the SSU6 Project as illustrated below:

Total Operating Emissions

	Tons/Year	Pounds/Day (annual average)
PM_{10}	16.3	90
NO_X	5.84	32
CO	10.4	57
VOC*	1.41	7.7
SO_2	0.5	2.7
H_2S	13.7	75

*VOC includes benzene and toluene

An annual approach was taken because of the many intermittent sources in the list of operating sources. This approach follows the intent of Rule 101, *Definitions for Potential Emissions*, cited below:

> "POTENTIAL EMISSIONS: the sum of the maximum emissions from all Emission Units at a Stationary Source, based on the maximum design capacity, unless otherwise limited by Enforceable conditions contained in the authority to construct and Permit to Operate, expressed in terms of pounds per quarter. (Pounds per quarter for PM10 and sulfur oxides shall be determined by multiplying the permitted emission level, pursuant to Rule 207, in pounds per day, by the permitted operating days per quarter.)"

Because significant quarterly changes are not expected, an annual approach was taken.

Although hydrogen sulfide is a pollutant not requiring offsets, the Applicant is proposing to ensure that the SSU6 Project does not result in a net increase of emissions of hydrogen sulfide by reducing hydrogen sulfide emissions at the Leathers Geothermal Power Plant. This facility has been emitting hydrogen sulfide at an average rate of 16.2 pounds per hour for the last three years. Refer to Table G-41 in Appendix G.3 for additional information. Upon approval of the SSU6 Project, the Applicant will proceed to install control technology (either LO-CAT System or bioreactor technology) to remove 90 percent of the hydrogen sulfide emitted from the Leathers Facility, prior to the operation of the SSU6 Project. This means that 64 tons per year of hydrogen sulfide offsets are available. With a proposed hydrogen sulfide emission rate of 13.7 tons per year and a 1.2 offset ratio, 16.5 tons per year would need to be offset, using the current procedures for offset determinations. This leaves 47.5 tons per year banked for future development.

Additionally, the Applicant proposes to offset PM_{10} emissions of the SSU6 Project with offsets derived from the APCD's approved list. The total operating emissions for PM_{10} are 16.3 tons per year. With a 1.2 offset ratio, the amount of offsets required, and those that will be obtained, are 19.6 tons per year. The list of these offsets is being submitted under separate cover.

Rule 400 – Fuel Burning Equipment:

This Rule basically limits any non-mobile fuel burning equipment unit to less than 140 pounds of NO_X per hour. No unit at the SSU6 Project has the potential to emit NO_X at this rate. SSU6 Project will be in compliance with this rule.

Rule 403 – General Limitations on the Discharge of Air Contaminants:

This Rule limits particulate matter emissions as follows (based on the filter cake process rates).

120 tons per day equals 15 tons per hour (30,000 lb/hr)

Silica Filter Cake: 13 lb/hr limit

2.5 tons per day equals 0.31 tons per hour (625 lb/hr)

Sulfur Filter Cake: 1.73 lb/hr limit

Expected emissions are as follows:

Silica Filter Cake:	0.006	lb/hr
Sulfur Filter Cake:	4.4E-05	lb/hr

The SSU6 Project is expected to be in compliance with this rule.

Rule 405 – Sulfur Compounds Emission Standards, Limitations and Prohibitions:

This Rule limits sulfur compounds, calculated as sulfur dioxide, to less than 0.2 percent by volume, being emitted from a unit (equivalent to 2000 ppm SO_2 or 1,063 ppm H_2S). Maximum H_2S concentrations emitted by the various sources are as follows:

Cooling Tower:	0.11	ppm
Dilution Water Heaters:	1.4	ppm
PTU:	22	ppm
Steam Vent Tank (low pressure)	2.2	ppm
Steam Vent Tank (standard pressure)	8.5	ppm
Steam Vent Tank (high pressure)	88	ppm

Thus, the SSU6 Project will be in compliance with Rule 405.

Rule 800:

This rule requires the use of reasonably available control measures (RACM) on all activities that generate fugitive dust. The Applicant has prepared an extensive list of mitigation measures in Section 5.1.4.1 that outline the RACM proposed for the construction and operations activities.

5.1.5.4 Involved Agencies and Contacts/Permits Required and Schedule

5.1.5.4.1 Involved Agencies and Agency Contacts

Agency contacts regarding the air quality assessment of the proposed project are as follows:

Issue	Agency/Address	Contact/Title	Telephone
Air Quality	California Energy Commission, 1519 Ninth Street Sacramento, CA 95814	Roger Johnson, Siting Program Manger Joe Loyer, Associate Mechanical Engineer	916-654-3940 916-654-3842

Issue	Agency/Address	Contact/Title	Telephone
Air Quality	Imperial County Air Pollution Control District, 150 S. 9th Street, El Centro, CA 92243	Brad Poiriez, APC Senior Manager, Harry Dillon	760-482-4606
Air Quality	US Environmental Protection Agency, 75 Hawthorne, Street, San Francisco, CA 94105	Gerardo Rios, Chief, New Source Review Section	415-744-1500
Air Quality	California Air Resources Board, P.O. Box 2815, Sacramento, CA 95812	Michael Tollstrup, Chief, Project Assessment Branch, Stationary Source Division	916-322-6026

5.1.5.4.2 Permits Required and Permitting Schedule

Responsible Agency	Permit/Approval	Schedule
Imperial County APCD	Determination of Compliance/ Authority to Construct	Application to be filed concurrent with AFC filing. Six-month application review period requested.
APCD or CARB	Statewide Portable Equipment Registration or APCD Permit to Operate	The Applicant will require contractors to have in place agency permits or approvals prior to commencing any work.

5.1.6 References

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U.S. EPA, 1992. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised: 1992; EPA-454/R-92-019; U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards: Research Triangle Park, NC, 1992.

U.S. EPA, 1998. Interagency Workgroup on Air Quality Modeling (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts; EPA-454/R-98-019; U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards: Research Triangle Park, NC, December 1998.

USFS (U.S. Forest Service), 1992. Guidelines for Evaluating Air Pollution Impacts on Class I Wilderness Areas in California: 1992; General Technical Report PSW-GTR-136; U.S. Department of Agriculture, Pacific Southwest Research Station, Forest Service, Albany, California, November 1992.

Table 5.1-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California	Federal
Ozone	1 hour 8 hours	0.09 ppm (180µg/m^3) ---	0.12 ppm (235µg/m^3) 0.08 ppm (157µg/m^3) [a]
Carbon Monoxide	1 hour 8 hours	20 ppm (23000µg/m^3) 9.0 ppm (10000µg/m^3)	35 ppm (40000µg/m^3) 9.0 ppm (10000µg/m^3)
Nitrogen Dioxide	1 hour Annual Average	0.25 ppm (470µg/m^3) ---	--- 0.053 ppm (100µg/m^3)
Sulfur Dioxide	1 hour 3 hours 24 hours Annual Average	0.25 ppm (655µg/m^3) --- 0.04 ppm (105µg/m^3) ---	--- 0.5 ppm (1300 µg/m^3) [b] 0.14 ppm (365 µg/m^3) 0.03 ppm (80 µg/m^3)
Suspended Particulate Matter (10 Micron)	24 hours Annual Geometric Mean Annual Arithmetic Mean	50 µg/m^3 30 µg/m^3 ---	150 µg/m^3 --- 50 µg/m^3
Suspended Particulate Matter (2.5 Micron)	24 hours Annual Arithmetic Mean	--- ---	65 µg/m^3 [d] 15 µg/m^3 [c]
Sulfates	24 hours	25 µg/m^3	---
Lead	30 days Quarterly	1.5 µg/m^3 ---	--- 1.5 µg/m^3
Hydrogen Sulfide	1 hour	0.03 ppm (42 µg/m^3)	---
Visibility Reducing Particles	8 hours (10 am to 6 pm PST)	[e]	---

[a] 3-year average of annual 4th-highest daily maximum
[b] This is a national secondary standard, which is designed to protect public welfare
[c] 3-year average
[d] 3-year average of 98th percentiles
[e] Insufficient amount to produce an extinction coefficient of 0.23 per kilometer because of particles when the relative humidity is less than 70 percent

Table 5.1-2
OZONE LEVELS AT NILAND
(PPM)

Niland - English Road Station, Imperial County	1996	1997	1998	1999	2000
Maximum 1-Hour Average	NA	0.1	0.11	0.09	NA
Number of Days Exceeding California 1-Hour Standard (0.09 ppm)	NA	1	5	0	NA
Number of Days Exceeding Federal 1-Hour Standard (0.12 ppm)	NA	0	0	0	NA
Maximum 8-Hour Average	NA	0.07	0.1	0.066	NA
Number of Days Exceeding Federal 8-Hour Standard (0.08 ppm)	NA	0	4	0	NA

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-3
OZONE LEVELS AT WESTMORLAND
(PPM)

Westmorland Station, Imperial County	1997	1998	1999	2000
Maximum 1-Hour Average	NA	0.12	0.145	NA
Number of Days Exceeding California 1-Hour Standard (0.09 ppm)	NA	10	24	NA
Number of Days Exceeding Federal 1-Hour Standard (0.12 ppm)	NA	0	10	NA
Maximum 8-Hour Average	NA	0.096	0.107	NA
Number of Days Exceeding Federal 8-Hour Standard (0.08 ppm)	NA	8	7	NA

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-4
OZONE LEVELS AT EL CENTRO
(PPM)

El Centro - 9th Street Station, Imperial County	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Maximum 1-Hour Average	0.11	0.12	0.15	0.13	0.15	0.14	0.13	0.13	0.14	NA
Number of Days Exceeding California 1-Hour Standard (0.09 ppm)	3	10	25	29	31	41	29	12	9	NA
Number of Days Exceeding Federal 1-Hour Standard (0.12 ppm)	0	0	3	1	9	6	2	1	2	NA
Maximum 8-Hour Average	0.082	0.096	0.098	0.1	0.112	0.113	0.111	0.087	0.083	NA
Number of Days Exceeding Federal 8-Hour Standard (0.08 ppm)	0	6	11	13	17	28	11	1	0	NA

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-5
NITROGEN DIOXIDE LEVELS AT CALEXICO-EAST
(PPM)

Calexico - East Station – Imperial County	1995	1996	1997	1998	1999	2000
Maximum 1 Hour Average	NA	0.072	0.091	0.105	0.11	0.124
Maximum Annual Average	NA	0.007	0.011	0.011	0.013	0.012
Days Over State Standard (0.25 ppm, 1-hour)	NA	0	0	0	0	0

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-6
NITROGEN DIOXIDE LEVELS AT
CALEXICO-ETHEL STREET
(PPM)

Calexico – Ethel Street Station – Imperial County	1995	1996	1997	1998	1999	2000
Maximum 1 Hour Average	0.217	0.164	0.128	0.257	0.286	0.192
Maximum Annual Average	0.016	0.014	0.015	NA	0.018	0.019
Days Over State Standard (0.25 ppm, 1-hour)	0	0	0	1	1	0

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-7
CARBON MONOXIDE LEVELS AT EL CENTRO
(PPM)

El Centro - 9th Street Station, Imperial County	1995	1996	1997	1998	1999	2000
Maximum 1 Hour Average	NA	12	6	7	NA	NA
Maximum 8 Hour Average	NA	6.75	3.71	3.5	NA	NA
Days Over the 8-Hour California Standard (9 ppm)	NA	0	0	0	NA	NA
Days Over the 8-Hour Federal Standard (9 ppm)	NA	0	0	0	NA	NA

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-8
CARBON MONOXIDE LEVELS AT CALEXICO-EAST
(PPM)

Calexico - East Station, Imperial County	1995	1996	1997	1998	1999	2000
Maximum 1 Hour Average	NA	22	21	18.4	14.0	17.6
Maximum 8 Hour Average	NA	8.74	16.29	13.0	9.37	11.3
Days Over the 8-Hour California Standard (9 ppm)	NA	0	4	3	1	1
Days Over the 8-Hour Federal Standard (9 ppm)	NA	0	2	3	0	1

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-9
CARBON MONOXIDE LEVELS AT CALEXICO-ETHEL STREET
(PPM)

Calexico – Ethel Street Station, Imperial County	1995	1996	1997	1998	1999	2000
Maximum 1 Hour Average	NA	27	24	23.5	22.9	19.9
Maximum 8 Hour Average	22.93	22.1	17.84	14.36	17.86	15.47
Days Over the 8-Hour California Standard (9 ppm)	17	11	13	10	13	7
Days Over the 8-Hour Federal Standard (9 ppm)	15	9	12	8	13	7

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-10
SULFUR DIOXIDE LEVELS AT CALEXICO-EAST
(PPM)

Calexico – East Station, Imperial County	1995	1996	1997	1998	1999	2000
Highest 1-hour average	NA	0.036	0.035	0.026	NA	NA
Highest 3-hour average	NA	0.02	0.026	0.021	NA	NA
Highest 24-hour average	NA	0.007	0.01	0.009	NA	NA
Annual Average	NA	0.001	0.002	0.003	NA	NA
Days Over 1-hour State Standard (0.25 ppm)	NA	0	0	0	NA	NA
Days Over 24-hour State Standard (0.04 ppm)	NA	0	0	0	NA	NA
Days Over 3-hour Federal Standard (0.5 ppm)	NA	0	0	0	NA	NA
Days Over 24-hour Federal Standard (0.14 ppm)	NA	0	0	0	NA	NA
Days Over the Annual Federal Standard (0.03 ppm)	NA	0	0	0	NA	NA

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-11
SULFUR DIOXIDE LEVELS AT CALEXICO-ETHEL STREET
(PPM)

Calexico – Ethel Street Station, Imperial County	1995	1996	1997	1998	1999	2000
Highest 1-hour average	NA	0.036	0.040	0.035	0.028	0.026
Highest 3-hour average	NA	0.028	0.031	0.026	0.024	0.022
Highest 24-hour average	0.018	0.017	0.015	0.019	0.018	0.009
Annual Average	0.005	0.004	0.003	0.003	0.002	0.002
Days Over 1-hour State Standard (0.25 ppm)	0	0	0	0	0	0
Days Over 24-hour State Standard (0.04 ppm)	0	0	0	0	0	0
Days Over 3-hour Federal Standard (0.5 ppm)	0	0	0	0	0	0
Days Over 24-hour Federal Standard (0.14 ppm)	0	0	0	0	0	0
Days Over the Annual Federal Standard (0.03 ppm)	0	0	0	0	0	0

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-12
PARTICULATE MATTER (PM_{10}) LEVELS AT NILAND
(µg/m3)

Niland – English Road Station, Imperial County	1995	1996	1997	1998	1999	2000
Maximum 24-Hour Average	NA	71	191	75	58	214
Annual Geometric Mean	NA	41.7	42.1	26.1	30.9	38.6
Annual Arithmetic Mean	NA	43.6	46.9	30.2	34.1	48.6
Estimated Number of Days Exceeding California 24-Hour Standard (50 µg/m^3)	NA	36	72	24	42	117

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-13
PARTICULATE MATTER (PM10) LEVELS AT WESTMORLAND
(µg/m3)

Westmorland Station, Imperial County	1993	1994	1995	1996	1997	1998	1999	2000
Maximum 24-Hour Average	NA	120	107	229	213	81	130	250
Annual Geometric Mean	NA	39.5	34.5	42.1	36.4	28.4	40.2	45.2
Annual Arithmetic Mean	NA	51.5	38.9	49.3	43.5	32.4	44.2	54.1
Estimated Number of Days Exceeding California 24-Hour Standard (50 µg/m3)	NA	36	78	120	72	54	102	126

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-14
PARTICULATE MATTER (PM_{10}) LEVELS AT BRAWLEY
(µg/m3)

Brawley – Main Street Station, Imperial County	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Maximum 24-Hour Average	229	103	175	126	122	257	532	81	89	204
Annual Geometric Mean	56.6	43.7	47.2	46.5	40.8	41.6	42.2	35.6	39.3	45.9
Annual Arithmetic Mean	63	47.5	53.3	51.9	45.1	47.1	50.7	38.1	42.1	51.3
Estimated Number of Days Exceeding California 24-Hour Standard (50 µg/m3)	192	138	138	108	105	129	84	51	87	114

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epa.gov/air/data/index.html)

Table 5.1-15
AIRBORNE LEAD LEVELS AT CALEXICO-ETHEL STREET
(µg/m3)

Calexico –Ethel Street Station, Imperial County	1995	1996	1997	1998	1999	2000	2001
Maximum 24-Hour Average	NA	0.16	0.1	0.09	0.1	0.08	0.05
Maximum Quarterly Average	NA	0.05	0.03	0.03	0.02	0.02	0.02

Sources: CARB ADAM website (www.arb.ca.gov/adam/welcome.html);
U.S. EPA AIRS website (www.epq.gov/air/data/index.html)

Table 5.1-16
PROPOSED BACKGROUND AIR QUALITY DATA

Pollutant	Averaging Period	Year	Level	Location
Ozone	1-hour	1998	0.11 ppm	Niland
Ozone	8-hour	1998	0.10 ppm	Niland
PM_{10}	24-hour	2000	214 µg/m^3	Niland
PM_{10}	AAM	2000	48.6 µg/m^3	Niland
PM_{10}	AGM	1997	42.1 µg/m^3	Niland
Carbon Monoxide	1-hour	1996	12.0 ppm (13800 µg/m^3)	El Centro
Carbon Monoxide	8-hour	1996	6.75 ppm (7763 µg/m^3)	El Centro
Nitrogen Dioxide	1-hour	2000	0.124 ppm (233 µg/m^3)	Calexico - East
Nitrogen Dioxide	Annual	1999	0.013 ppm (24 µg/m^3)	Calexico - East
Sulfur Dioxide	1-hour	1996	0.036 ppm (95 µg/m^3)	Calexico - East
Sulfur Dioxide	3-hour	1997	0.026 ppm (68 µg/m^3)	Calexico - East
Sulfur Dioxide	24-hour	1997	0.015 ppm (39 µg/m^3)	Calexico - East
Sulfur Dioxide	Annual	1998	0.003 ppm (8 µg/m^3)	Calexico - East
Lead	Quarterly	1999	0.05 µg/m^3	Calexico - Ethel St.
Hydrogen Sulfide	1-hour	----	24.6 µg/m^3	Niland

Note:
AAM – Annual Arithmetic Mean; AGM – Annual Geometric Mean

Table 5.1-17
IMPERIAL COUNTY AMBIENT AIR QUALITY STATUS

Pollutant	CAAQS	NAAQS
Carbon Monoxide	Unclassified/Attainment	Unclassified/Attainment
Nitrogen Dioxide	Attainment	Unclassified/Attainment
Hydrogen Sulfide	Unclassified/Attainment**	----
Ozone	Nonattainment	Nonattainment
Sulfur Dioxide	Attainment	Attainment
Sulfates	Attainment	----
PM_{10}	Nonattainment	Nonattainment*
Lead	Attainment	Attainment

* Initially California was to attain PM_{10} standards in Imperial County by December 31, 1994. Currently, the area is officially still a moderate nonattainment area even though available data suggests the area would attain standards except for the influence of sources outside the US. **Refer to discussion in Section 5.1.1.4.5

Table 5.1-18
WELL DRILLING EMISSIONS
(TONS PER YEAR)

	NO_X	CO	VOC	SO_2	PM_{10}
One Well	8.4	1.0	0.12	0.24	0.35
Maximum Annual	124	15	1.7	3.5	5.1

Table 5.1-19
CONSTRUCTION COMBUSTION EMISSIONS
(TONS PER YEAR)

	NO_X	CO	VOC	SO_2	PM_{10}
Construction Equipment	20	16	2.9	0.4	1.1
Worker Travel	6.2	73	7.9	0.05	0.16
Delivery Trucks	7.1	2.1	0.6	0.07	0.23
Total	33	91	11	0.5	1.5

Table 5.1-20
EXPECTED EMISSIONS FROM FLOW TESTING

Pollutant	Production Well	Injection Well	Annual Emissions
	(lb/hr)	(lb/hr)	(tons/yr)
PM_{10}	97	56	44
Hydrogen Sulfide	18	15	8.6
Ammonia	71	59	34
Arsenic-NC	1.9E-03	1.6E-03	9.1E-04
Arsenic-PM	4.4E-03	2.6E-03	2.0E-03
Benzene	0.33	0.28	0.16
Beryllium	4.1E-06	2.4E-06	1.9E-06
Boron	0.13	7.6E-02	6.0E-02
Cadmium	5.1E-04	3.0E-04	2.3E-04
Chromium	1.2E-06	7.2E-07	5.6E-07
Copper	6.4E-03	9.6E-04	7.4E-04
Ethylbenzene	1.9E-04	1.6E-04	9.4E-05
Lead	3.3E-02	1.9E-02	1.5E-02
Manganese	0.41	0.24	0.19
Mercury	3.2E-05	4.1E-05	1.4E-05
Nickel	8.2E-06	4.8E-06	3.7E-06
Selenium	2.0E-06	1.2E-06	9.3E-07
Toluene	4.5E-03	3.8E-03	2.2E-03
Xylenes	5.6E-04	4.6E-04	2.7E-04
Zinc	0.13	7.8E-02	6.1E-02
	(Ci/hr)		(Ci/yr)
Radon	1.4E-03	1.1E-03	1.3

Notes: Arsenic-NC means arsenic associated with the noncondensible gases, assumed to be arsine.
Arsenic-PM means arsenic associated with geothermal brine carryover.

Table 5.1-21
TOTAL CONSTRUCTION EMISSIONS
(TONS PER YEAR)

	NO_X	CO	VOC	SO_X	PM_{10}	H_2S
Fugitive Dust	---	---	---	---	13.1	---
Well Drilling	124	15	1.7	3.5	5.1	---
Construction Equipment	33	91	11	0.5	1.5	---
Well Flow Testing	---	---	0.16 [a]	---	44	8.6
Total	157	106	13	4.0	64	8.6

[a] Sum of benzene and other organic compounds

Table 5.1-22
EXPECTED EMISSIONS FROM PLANT COMMISSIONING
(TONS PER COMMISSION PERIOD)

	Total
PM_{10}	8.6
H2S	18
Ammonia	113
Arsenic-NC	1.9E-03
Arsenic-PM	3.9E-04
Benzene	0.33
Beryllium	1.5E-05
Boron	1.1E-02
Cadmium	4.5E-05
Chromium	1.1E-07
Copper	1.5E-04
Ethylbenzene	2.0E-04
Lead	2.9E-03
Manganese	3.6E-02
Mercury	1.1E-04
Nickel	7.2E-07
Selenium	1.8E-07
Toluene	4.7E-03
Xylenes	5.7E-04
Zinc	1.2E-02
Radon	4.3 (Ci/period)

Note: Represents 354 hours of emissions that occur only once during plant life

Table 5.1-23
NONCONDENSIBLE GAS EMISSIONS

Pollutant	Uncontrolled	Controlled	Controlled
	(lb/hr)	(lb/hr)	(tons/yr)
Hydrogen sulfide	153	0.77	3.4
Ammonia	0.12	0.12	0.53
Arsenic-NC	0.02	0.002	8.8E-03
Benzene	3.5	0.18	0.77
Ethylbenzene	2.1E-04	2.1E-04	9.1E-04
Mercury	2.2E-04	2.2E-05	9.5E-05
Toluene	4.9E-03	4.9E-03	2.1E-02
Xylenes	5.9E-04	5.9E-04	2.6E-03
	(Ci/hr)	(Ci/hr)	(Ci/yr)
Radon	1.4E-02	1.4E-02	126

Table 5.1-24
OFFGASSING EMISSIONS

Pollutant	Uncontrolled	Controlled	Controlled
	(lb/hr)	(lb/hr)	(tons/yr)
Ammonia	712	712	2681
Hydrogen sulfide	34	1.7	7.4

Table 5.1-25
DRIFT EMISSIONS

Pollutant	Controlled	Controlled
	(lb/hr)	(tons/yr)
PM_{10}	3.5	15
Ammonia	9.6E-04	4.2E-03
Arsenic-PM	6.9E-06	3.0E-05
Beryllium	6.4E-09	2.8E-08
Boron	2.1E-04	9.0E-04
Cadmium	8.0E-07	3.5E-06
Chromium	1.9E-09	8.5E-09
Copper	2.6E-06	1.1E-05
Lead	5.2E-05	2.3E-04
Manganese	6.4E-04	2.8E-03
Nickel	1.3E-08	5.6E-08
Selenium	3.2E-09	1.4E-08
Zinc	2.1E-04	9.2E-04

Table 5.1-26
TOTAL COOLING TOWERS EMISSIONS

Pollutant [a]	tons/yr
PM_{10}	15
Hydrogen Sulfide	11
Ammonia	2681
Benzene	0.77
Toluene	0.021
Radon	126 Ci/yr

[a] Pollutants less than 0.01 tons per year have not been listed. Summary information is presented in Appendix G.1, Table G-8.

Table 5.1-27
DILUTION WATER HEATERS EMISSIONS

Pollutant	lb/hr	tons/yr
PM_{10}	0.14	0.59
Hydrogen sulfide	0.68	3.0
Ammonia	17	72
Arsenic-PM	6.2E-06	2.7E-05
Beryllium	5.7E-09	2.5E-08
Boron	1.8E-04	8.1E-04
Cadmium	7.2E-07	3.1E-06
Chromium	1.7E-09	7.6E-09
Copper	2.3E-06	1.0E-05
Lead	4.6E-05	2.0E-04
Manganese	5.7E-04	2.5E-03
Mercury	3.0E-04	1.3E-03
Nickel	1.2E-08	5.0E-08
Selenium	2.9E-09	1.3E-08
Zinc	1.9E-04	8.2E-04

Table 5.1-28
SILICA FILTER CAKE HANDLING EMISSIONS

Pollutant	Concentration (ppm)	lb/hr	tons/yr
PM_{10}	---	6.4E-03	1.4E-03
Antimony	10	1.3-E-07	1.4E-08
Arsenic	300	3.8E-06	4.2E-07
Beryllium	10	1.3E-07	1.4E-08
Cadmium	0.2	2.6E-09	2.8E-10
Chromium	1.0	1.3E-08	1.4E-09
Cobalt	4	5.1E-08	5.6E-09
Copper	250	3.2E-06	3.5E-07
Lead	30	3.8E-07	4.2E-08
Manganese	3500	4.5E-05	4.9E-06
Nickel	1.5	1.9E-08	2.1E-09
Silver	0.4	5.1E-09	5.6E-10
Strontium	6000	7.7E-05	8.4E-06
Zinc	130	1.7E-06	1.8E-07
	(pCi/g)	(Ci/hr)	(Ci/yr)
Radon	---	1.1E-05	4.8E-02
Radium 226	10	5.8E-11	1.3E-08
Radium 228	10	5.8E-11	1.3E-08

Notes: Hourly rate based on daily maximum, while tons/year based on annual average.

Table 5.1-29
SULFUR FILTER CAKE HANDLING EMISSIONS

Pollutant	Concentration	lb/hr	tons/yr
PM_{10}	---	4.0E-05	3.0E-05
	(Percent)		
Sulfur	60%	---	---
Water	36%	---	---
Potassium bicarbonate	1.09%	---	---
Potassium thiosulfate	2.84%	---	---
	(ppm)		
Benzene	0.01	4.4E-13	2.9E-13
Iron	61	---	---
Mercury	11.0	4.9E-10	3.2E-10

Table 5.1-30
EMERGENCY GENERATORS AND FIRE PUMP EMISSIONS
(POUNDS PER HOUR)

	NO_X	CO	VOC	SO_X	PM_{10}
Emergency Generator (480 kV)	4.9	0.13	0.04	0.19	0.029
Emergency Generator (4160 kV)	34.0	2.2	0.82	1.2	0.65
Fire Pump	3.6	0.16	0.05	0.12	0.045
Total (tons/yr)	4.3	0.25	0.091	0.15	0.072

Table 5.1-31
OPERATING AND MAINTENANCE EQUIPMENT EMISSIONS
(TONS PER YEAR)

	NO_X	CO	VOC	SO_X	PM_{10}
Fugitive Dust	---	---	---	---	0.32
Equipment	1.6	10	0.55	0.35	0.023
Total (tons/yr)	1.6	10	0.55	0.35	0.34

Table 5.1-32
TOTAL OPERATING EMISSIONS

Pollutant	tons/yr
PM_{10}	16
NO_X	5.8
CO	10
VOC	1.4
SO_2	0.49
Hydrogen sulfide	14
Ammonia	2754
Benzene	0.77
Toluene	0.021
	Ci/year
Radon	126

Notes: Pollutants less than 0.01 tons per year have not been listed; VOC includes benzene and toluene

Table 5.1-33
WELL REWORK/NEW WELL DRILLING EMISSIONS

	NO_2	CO	VOC	SO_2	PM_{10}
Pounds per Hour Per Well	26	3.2	0.36	0.73	1.1
Tons per Year	6.9	0.84	0.09	0.19	0.29

Table 5.1-34
WELL FLOW EMISSIONS

	Production Well	Injection Well	Annual Emissions
	(lb/hr)	(lb/hr)	(tons/yr)
PM_{10}	97	56	18
Hydrogen sulfide	18	15	3.8
Ammonia	71	59	15
Arsenic-NC	1.9E-03	1.6E-03	4.0E-04
Arsenic-PM	4.4E-03	2.6E-03	8.2E-04
Benzene	0.33	0.28	7.1E-02
Beryllium	4.1E-06	2.4E-06	7.6E-07
Boron	0.13	0.08	2.4E-02
Cadmium	5.1E-04	3.0E-04	9.5E-05
Chromium	1.2E-06	7.2E-07	2.3E-07
Copper	1.6E-03	9.5E-04	3.0E-04
Ethylbenzene	1.9E-04	1.6E-04	4.2E-05
Lead	3.3E-02	1.9E-02	6.1E-03
Manganese	0.41	0.24	7.6E-02
Mercury	3.5E-05	5.9E-05	1.1E-05
Nickel	8.2E-06	4.8E-06	1.5E-06
Selenium	2.0E-06	1.2E-06	3.8E-07
Toluene	4.5E-03	3.8E-03	9.8E-04
Xylenes	5.6E-04	4.6E-04	1.2E-04
Zinc	0.13	8.0E-02	2.5E-02
	(Ci/hr)	(Ci/hr)	(Ci/yr)
Radon	1.4E-03	1.1E-03	0.58

Table 5.1-35
STEAM VENT TANK EMISSIONS

	Tons Per Year
PM_{10}	0.94
Hydrogen sulfide	0.51
Ammonia	16
Arsenic-NC	1.0E-04
Arsenic-PM	3.6E-06
Benzene	1.3E-02
Beryllium	3.3E-09
Boron	1.1E-04
Cadmium	4.2E-07
Chromium	1.0E-09
Copper	1.3E-06
Ethylbenzene	1.0E-05
Lead	2.7E-05
Manganese	3.3E04
Mercury	2.4E-05
Nickel	6.2E-09
Selenium	1.7E-09
Toluene	2.4E-04
Xylenes	3.0E-05
Zinc	1.1E-04
	(Ci/yr)
Radon	0.79

Table 5.1-36
PLANT STARTUP EMISSIONS

	Tons Per Year
PM_{10}	2.2
Hydrogen sulfide	0.42
Ammonia	5.2
Arsenic-NC	5.5E-05
Arsenic-PM	1.0E-04
Benzene	8.6E-03
Beryllium	9.2E-08
Boron	3.0E-03
Cadmium	1.2E-05
Chromium	2.8E-08
Copper	3.7E-05
Ethylbenzene	5.7E-06
Lead	7.4E-04
Manganese	9.2E-03
Mercury	2.9E-06
Nickel	1.9E-07
Selenium	4.6E-08
Toluene	1.3E-04
Xylenes	1.6E-05
Zinc	3.0E-03
	(Ci/yr)
Radon	0.24

Table 5.1-37
METEOROLOGICAL RECORD PERCENT VALID DATA RECOVERY

Parameter	1995	1996	1997	1998	1999
Surface Data: Imperial County Airport					
Wind Speed	93	96	89	88	91
Wind Direction	93	96	89	88	91
Temperature	99	99	99	99	99
Cloud Cover	99	84	99	99	99
Ceiling Height	99	99	99	99	99
Upper Air Data: Tucson, AZ					
Morning Data	88	81	80	84	74
Evening Data	52	49	43	60	65

Notes: Values in percent. Seasonal Holzworth Mixing Height Data Used for Substitution of Missing Data (in meters) are as follows.

HOLZWORTH MIXING HEIGHT DATA

	Winter	Spring	Summer	Fall
Morning Data	247	260	356	241
Evening Data	1424	2664	3110	2110

Table 5.1-38
HIGHEST 24-HOUR PM_{10} CONCENTRATIONS
(µg/m3)

Activity	1995	1996	1997	1998	1999
Fugitive Dust	62	58	70	55	48
Well Drilling	4.3	4.4	4.1	5.3	5.5
Construction Equipment	2.4	3.0	2.4	3.1	2.6
Well Flow Testing	41	37	33	40	40
Combined (above 4 activities)	66	63	72	58	48
Plant Commissioning (#1)	28	26	27	29	33

Note: Years cited in the modeling results tables correspond to the five years of meteorological data used in the modeling simulation.

Table 5.1-39
ANNUAL PM_{10} CONCENTRATIONS
(µg/m3)

Activity	1995	1996	1997	1998	1999
Fugitive Dust	15	14	14	14	13
Well Drilling	0.1	0.1	0.1	0.1	0.1
Construction Equipment	0.2	0.2	0.2	0.3	0.2
Well Flow Testing (PTU)	0.3	0.3	0.3	0.3	0.3
Combined (above 4 activities)	15	14	14	15	14

Table 5.1-40
CONSTRUCTION PM_{10} IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined	24 Hour	72	214	286	50	150
Plant Commissioning	24 Hour	33	214	247	50	150
Combined	Annual (1)	15	48.6	60.7	---	50
Combined	Annual (2)	15	42.1	57.2	30	---

(1) AAM
(2) AGM

Table 5.1-41
HIGHEST 24-HOUR PM_{10} CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Silica Filter Cake Handling	0.8	0.7	0.9	0.7	0.8
Sulfur Filter Cake Handling	<0.1	<0.1	<0.1	<0.1	<0.1
Cooling Towers Drift	1.9	1.3	1.9	1.9	1.8
Dilution Water Heaters	0.2	0.3	0.2	0.2	0.3
Emergency Generator (480)	0.1	0.2	0.1	0.1	0.2
Emergency Generator (4160)	0.5	0.8	0.6	0.6	0.9
Fire Pump	0.4	0.4	0.5	0.5	0.4
Operation and Maintenance Exhaust	0.5	0.5	0.5	0.5	0.5
Operation and Maintenance Dust	1.3	1.0	0.8	0.9	0.9
Combined	1.9	2.3	2.1	2.1	2.2

Table 5.1-42
ANNUAL PM_{10} CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Silica Filter Cake Handling	<0.1	<0.1	<0.1	<0.1	<0.1
Sulfur Filter Cake Handling	<0.1	<0.1	<0.1	<0.1	<0.1
Cooling Towers Drift	0.1	0.1	0.1	0.1	0.1
Dilution Water Heaters	<0.1	<0.1	<0.1	<0.1	<0.1
Emergency Generator (480)	<0.1	<0.1	<0.1	<0.1	<0.1
Emergency Generator (4160)	<0.1	<0.1	<0.1	<0.1	<0.1
Fire Pump	<0.1	<0.1	<0.1	<0.1	<0.1
Operation and Maintenance Exhaust	<0.1	<0.1	<0.1	<0.1	<0.1
Operation and Maintenance Dust	0.2	0.2	0.2	0.2	0.2
Combined	0.3	0.3	0.3	0.3	0.3

Table 5.1-43
OPERATIONS PM_{10} IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined Plant Operations	24 Hour	2.3	214	216	50	150
Combined Plant Operations	Annual (1)	0.3	45.6	46	---	50
Combined Plant Operations	Annual (2)	0.3	42.1	42	30	---

(1) AAM

(2) AGM

Table 5.1-44
HIGHEST 24-HOUR PM_{10} CONCENTRATIONS (µg/m3)
FROM TEMPORARY ACTIVITIES

Activity	1995	1996	1997	1998	1999
Well Rework	3.5	2.9	2.9	3.5	2.7
Well Flow	41	35	32	38	38
Steam Vent Tanks	17	16	19	19	20
Plant Startup	28	25	27	29	33

Table 5.1-45
TEMPORARY PM_{10} IMPACTS FOR HIGHEST 24-HOUR
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Well Rework	24 Hour	3.5	214	218	50	150
Well Flow	24 Hour	41	214	255	50	150
Steam Vent Tanks	24 Hour	20	214	234	50	150
Plant Startup	24 Hour	33	214	247	50	150

Table 5.1-46
HIGHEST 1-HOUR H_2S CONCENTRATIONS
(µg/m3)

Activity	*1995*	*1996*	*1997*	*1998*	*1999*
Well Flow Testing	35	34	36	35	33
Plant Commissioning (#3a)	129	137	148	136	127

Notes: Refer to Tables G-25 and G-26 in Appendix G.2

Table 5.1-47
CONSTRUCTION H_2S IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard
Well Flow Testing	1 Hour	36	24.6	61	42
Plant Commissioning	1 Hour	148	24.6	173	42

Table 5.1-48
HIGHEST 1-HOUR H_2S CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Cooling Towers	5.7	5.5	7.5	5.5	6.0
Dilution Water Heaters	4.3	3.9	3.8	3.9	3.8
Combined	5.8	5.6	7.5	6.0	6.0

Notes: Refer to Table G-27 in Appendix G.2.

Table 5.1-49
OPERATIONS H_2S IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard
Combined	1 Hour	7.5	24.6	33	42

Table 5.1-50
HIGHEST 1-HOUR H_2S CONCENTRATIONS (µg/m3)
FROM TEMPORARY

Activity	1995	1996	1997	1998	1999
Well Flow	34	33	34	35	33
Steam Vent Tanks	6.4	7.8	7.2	6.4	6.6
Plant Startup	20	22	20	22	21

Notes: Refer to Table G-28 in Appendix G.2

Table 5.1-51
TEMPORARY H_2S IMPACTS FOR 1-HOUR
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard
Well Flow	1 Hour	35	24.6	60	42
Steam Vent Tanks	1 Hour	7.8	24.6	33	42
Plant Startup	1 Hour	22	24.6	47	42

Table 5.1-52
HIGHEST 1-HOUR NO_2 CONCENTRATIONS
(µg/m3)

Activity	1995	1996	1997	1998	1999
Well Drilling	206	217	244	243	240
Construction Equipment	191	191	190	206	210
Combined	244	252	266	268	240

Notes: The Ozone Limiting Method (ISCST-OLM) was used for 1-hour concentrations.
Refer to Table G-29 in Appendix G.2.

Table 5.1-53
HIGHEST ANNUAL NO_2 CONCENTRATIONS
(µg/m3)

Activity	1995	1996	1997	1998	1999
Well Drilling	2.6	2.8	2.9	2.4	2.3
Construction Equipment	3.1	3.3	3.1	3.4	3.2
Combined	5.1	5.0	4.7	5.2	4.9

Table 5.1-54
CONSTRUCTION NO_2 IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined	1 Hour	268	233	501	470	---
Combined	Annual	5.2	24	29	---	100

Table 5.1-55
HIGHEST 1-HOUR NO_2 CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Fire Pump	174	171	153	145	159
Operations and Maintenance	116	125	111	94	94
Combined	209	203	175	197	177

Notes: Ozone Limiting Method used. Refer to Table G-31 in Appendix G.2.

Table 5.1-56
HIGHEST ANNUAL NO_2 CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Emergency Generator (480)	<0.1	<0.1	<0.1	<0.1	<0.1
Emergency Generator (4160)	<0.1	<0.1	<0.1	<0.1	<0.1
Fire Pump	<0.1	<0.1	<0.1	<0.1	<0.1
Operations and Maintenance	0.4	0.4	0.3	0.3	0.3
Combined	0.5	0.5	0.4	0.5	0.4

Table 5.1-57
OPERATIONS NO_2 IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined	1 Hour	209	233	442	470	---
Combined	Annual	0.5	24	25	---	100

Table 5.1-58
HIGHEST 1-HOUR NO_2 CONCENTRATIONS (µg/m3)
FROM TEMPORARY

Activity	1995	1996	1997	1998	1999
Well Rework	206	217	236	210	222

Notes: Ozone Limiting Method used. Refer to Table G-33 in Appendix G.2.

Table 5.1-59
TEMPORARY NO_2 IMPACTS (µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Well Rework	1 Hour	236	233	469	470	---

Table 5.1-60
HIGHEST 1-HOUR CO CONCENTRATIONS FROM CONSTRUCTION
(µg/m3)

Activity	*1995*	*1996*	*1997*	*1998*	*1999*
Well Drilling	82	81	81	79	82
Construction Equipment	185	192	188	189	181
Combined	185	192	193	189	181

Table 5.1-61
HIGHEST 8-HOUR CO CONCENTRATIONS FROM CONSTRUCTION
(µg/m3)

Activity	1995	1996	1997	1998	1999
Well Drilling	33	26	27	27	23
Construction Equipment	88	88	82	111	105
Combined	88	88	86	111	105

Notes: Refer to Table G-34 in Appendix G.2.

Table 5.1-62
CONSTRUCTION CO IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined	1 Hour	193	13800	13993	23000	40000
Combined	8 Hour	111	7763	7874	10000	10000

Table 5.1-63
HIGHEST 1-HOUR CO CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Emergency Generator (480)	4.0	6.4	3.9	4.0	4.2
Emergency Generator (4160)	11.1	9.6	12.7	11.4	9.6
Fire Pump	9.7	9.6	9.8	9.4	9.8
Operations and Maintenance	2190	1983	2130	2108	1975
Combined	2190	1983	2130	2108	1975

Table 5.1-64
HIGHEST 8-HOUR CO CONCENTRATIONS (µg/m3)FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Emergency Generators (480)	1.3	1.5	1.4	1.5	1.9
Emergency Generators (4160)	3.4	4.8	3.5	3.9	6.6
Fire Pump	3.2	2.8	3.2	3.4	2.6
Operations and Maintenance	426	561	556	549	529
Combined	426	561	557	550	529

Notes: Refer to Table G-35 in Appendix G.2.

Table 5.1-65
OPERATIONS CO IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined	1 Hour	2190	13800	15990	23000	40000
Combined	8 Hour	561	7763	8324	10000	10000

Table 5.1-66
HIGHEST 1-HOUR CO CONCENTRATIONS (µg/m3)
FROM TEMPORARY

Activity	1995	1996	1997	1998	1999
Well Rework	82	81	81	79	82

Table 5.1-67
HIGHEST 8-HOUR CO CONCENTRATIONS (µg/m3)
FROM TEMPORARY

Activity	1995	1996	1997	1998	1999
Well Rework	31	25	27	27	19

Notes: Refer to Table G-34 in Appendix G-2.

Table 5.1-68
TEMPORARY CO IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Well Rework	1 Hour	82	13800	13882	23000	40000
Well Rework	8 Hour	31	7763	7794	10000	10000

Table 5.1-69
HIGHEST 1-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM CONSTRUCTION

Activity	1995	1996	1997	1998	1999
Well Drilling	18.8	18.7	18.7	18.1	18.9
Construction Equipment	4.5	4.6	4.5	4.6	4.4
Combined	18.8	18.7	18.7	18.1	18.9

Table 5.1-70
HIGHEST 3-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM CONSTRUCTION

Activity	1995	1996	1997	1998	1999
Well Drilling	12.0	9.0	11.4	8.6	8.9
Construction Equipment	3.2	2.6	3.1	3.8	3.4
Combined	12.0	9.0	11.4	8.6	8.9

Table 5.1-71
HIGHEST 24-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM CONSTRUCTION

Activity	1995	1996	1997	1998	1999
Well Drilling	4.0	5.1	4.3	4.3	5.5
Construction Equipment	0.8	1.0	0.8	1.0	0.8
Combined	4.0	5.1	4.3	4.3	5.5

Table 5.1-72
HIGHEST ANNUAL SO_2 CONCENTRATIONS (µg/m3)
FROM CONSTRUCTION

Activity	1995	1996	1997	1998	1999
Well Drilling	<0.1	0.1	<0.1	<0.1	<0.1
Construction Equipment	<0.1	<0.1	<0.1	<0.1	<0.1
Combined	0.2	0.1	0.1	0.2	0.1

Notes: Refer to Table G-36 in Appendix G.2.

Table 5.1-73
CONSTRUCTION SO_2 IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined	1 Hour	18.9	95	114	655	---
Combined	3 Hour	12	68	80	---	1300
Combined	24 Hour	5.5	39	45	105	365
Combined	Annual	0.2	8	8	---	80

Table 5.1-74
HIGHEST 1-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Emergency Generator (480)	5.7	9.0	5.6	5.6	5.9
Emergency Generator (4160)	5.9	5.1	6.7	6.0	5.1
Fire Pump	7.1	7.1	7.2	6.9	7.2
Operations and Maintenance	50.7	45.9	49.4	48.9	45.8
Combined	50.7	45.9	49.4	48.9	45.8

Table 5.1-75
HIGHEST 3-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Emergency Generator (480)	3.4	3.6	4.5	3.3	3.5
Emergency Generator (4160)	2.7	4.0	4.3	3.1	4.0
Fire Pump	3.5	3.7	3.4	4.8	3.4
Operations & Maintenance Equipment	21.6	15.3	17.9	18.6	16.1
Combined	21.6	15.3	18.4	18.6	16.3

Table 5.1-76
HIGHEST 24-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Emergency Generator (480)	0.8	1.1	0.9	0.8	1.2
Emergency Generator (4160)	1.0	1.5	1.0	1.1	1.6
Fire Pump	1.1	0.9	1.2	1.3	1.0
Operations & Maintenance Equipment	5.1	5.1	5.5	5.6	5.1
Combined	5.3	6.4	6.3	6.1	6.7

Table 5.1-77
HIGHEST ANNUAL SO_2 CONCENTRATIONS (µg/m3)
FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Emergency Generator (480)	<0.1	<0.1	<0.1	<0.1	<0.1
Emergency Generator (4160)	<0.1	<0.1	<0.1	<0.1	<0.1
Fire Pump	<0.1	<0.1	<0.1	<0.1	<0.1
Operations and Maintenance	<0.1	<0.1	<0.1	<0.1	<0.1
Combined	0.1	<0.1	<0.1	<0.1	<0.1

Notes: Refer to Table G-37 in Appendix G.2.

Table 5.1-78
SO_2 IMPACTS FROM OPERATIONS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined	1 Hour	51	95	146	655	---
Combined	3 Hour	22	68	90	---	1300
Combined	24 Hour	6.7	39	46	105	365
Combined	Annual	0.1	8	8	---	80

Table 5.1-79
HIGHEST 1-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM TEMPORARY

Activity	1995	1996	1997	1998	1999
Well Rework	18.8	18.7	18.7	18.1	18.9

Table 5.1-80
HIGHEST 3-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM TEMPORARY

Activity	1995	1996	1997	1998	1999
Well Rework	12.0	8.8	11.4	8.6	8.8

Table 5.1-81
HIGHEST 24-HOUR SO_2 CONCENTRATIONS (µg/m3)
FROM TEMPORARY

Activity	1995	1996	1997	1998	1999
Well Rework	2.4	2.4	2.1	2.8	2.2

Notes: Refer to Table G-36 in Appendix G.2.

Table 5.1-82
TEMPORARY SO_2 IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Well Rework	1 Hour	18.9	95	114	655	---
Well Rework	3 Hour	12	68	80	---	1300
Well Rework	24 Hour	2.8	39	42	105	365

Table 5.1-83
HIGHEST MONTHLY AIRBORNE LEAD CONCENTRATIONS
(µg/m3)

Activity	1995	1996	1997	1998	1999
Well Flow Testing	<0.01	<0.01	<0.01	<0.01	<0.01

Notes: Lead emission rate based on peak rates. Refer to Table G-38 in Appendix G.2

Table 5.1-84
CONSTRUCTION AIRBORNE LEAD IMPACTS
(µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Well Flow Testing	Monthly	<0.01	0.05	0.05	1.5	1.5

Notes: California Standard is monthly, Federal Standard is quarterly

Table 5.1-85
HIGHEST MONTHLY AIRBORNE LEAD CONCENTRATIONS (µg/m3) FROM OPERATIONS

Activity	1995	1996	1997	1998	1999
Filter Cake Handling	<0.01	<0.01	<0.01	<0.01	<0.01
Cooling Towers Drift	<0.01	<0.01	<0.01	<0.01	<0.01
Dilution Water Heaters	<0.01	<0.01	<0.01	<0.01	<0.01
Combined	<0.01	<0.01	<0.01	<0.01	<0.01

Notes: Refer to Table G-38 in Appendix G.2.

Table 5.1-86
OPERATIONS AIRBORNE LEAD IMPACTS (µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Combined	Monthly	<0.01	0.05	0.05	1.5	1.5

Notes: California Standard is monthly, Federal Standard is quarterly

Table 5.1-87
HIGHEST MONTHLY AIRBORNE LEAD CONCENTRATIONS (µg/m3) FROM TEMPORARY

Activity	1995	1996	1997	1998	1999
Well Flow	<0.01	<0.01	<0.01	<0.01	<0.01
Steam Vent Tanks	<0.01	<0.01	<0.01	<0.01	<0.01

Notes: Refer to Table G-38 in Appendix G.2.

Table 5.1-88
TEMPORARY AIRBORNE LEAD IMPACTS FOR HIGHEST MONTHLY (µg/m3)

Source	Averaging Period	Maximum Impact	Background	Total	California Standard	Federal Standard
Well Flow	Monthly	<0.01	0.05	0.05	1.5	1.5
Steam Vent Tanks	Monthly	<0.01	0.05	0.05	1.5	1.5

Notes: California standard is monthly, federal standard is quarterly

Table 5.1-89
COMPARISON OF MAXIMUM CLASS I IMPACTS TO U.S. EPA PROPOSED SIGNIFICANT IMPACT LEVELS AND CLASS I INCREMENTS

Pollutant Name	Averaging Time	Maximum Impacts (µg/m3)	Proposed Class I SILs (µg/m3) [a]	Percent of Proposed Class I SILs	PSD Class I Increments (µg/m3)	Percent of PSD Class I Increments
PM_{10}	24-Hour	0.024	0.3	8.0%	8	0.30%
	Annual	0.0024	0.2	1.2%	4	0.06%
SO_2	3-Hour	0.068	1.0	6.8%	24	0.27%
	24-Hour	0.012	0.2	6.0%	5	0.24%
	Annual	0.0013	0.1	1.3%	2	0.07%
NO_x	Annual	0.020	0.1	20.0%	2.5	0.80%

Notes: [a] 61 Federal Register 38250, 1996 (specifically 61 FR 38292).

Table 5.1-90
MODELING INPUTS FOR CALPUFF DEPOSITION ANALYSES

CHEMICAL SPECIES MODELED FOR DEPOSITION	
Nitrogen Containing Species	**Deposition Mechanism**
HNO_3	Dry and Wet
NO_3	Dry and Wet
NO_x	Dry
Sulfur Containing Species	**Deposition Mechanism**
SO_2	Dry and Wet
SO_4	Dry and Wet
WEIGHT OF CHEMICAL SPECIES MODELED FOR DEPOSITION IN POSTUTIL	
Species Contributing to Total Nitrogen	**Weight [a]**
$(NH_4)_2(SO_4)$ as SO_4	(2x14)/(32+4x16)=0.291667
NO_x as NO_2	14/(14+2x16)=0.304348
HNO_3	14/(1+14+3x16)=0.222222
$(NH_4)NO_3$ as NO_3	(2x14)/(14+3x16)=0.451623
Species Contributing to Total Sulfur	**Weight**
SO_2	32/(32+2x16)=0.500000
SO_4	32/(32+4x16)=0.333333

[a] Number of grams of nitrogen or sulfur in 1 gram of the species as modeled by CALPUFF and calculated from the molecular weights for nitrogen (14), sulfur (32), oxygen (16), and hydrogen (1) as shown above

Table 5.1-91
MAXIMUM MODEL-PREDICTED NITROGEN AND SULFUR DEPOSITION RATES

Chemical Species	Deposition Rate (kg/ha-yr)	Screening Threshold (kg/ha-yr)	Percent of Screening Threshold
Total Nitrogen	0.00198	0.005	39.6%
Total Sulfur	0.00019	0.005	3.8%

Table 5.1-92
MODEL-PREDICTED CHANGE IN LIGHT EXTINCTION IN JOSHUA TREE NATIONAL PARK

Visibility Calculation	Model-Predicted B_{ext} (Mm^{-1})	Background B_{ext} (Mm^{-1})	Percent Change in B_{ext}
Method 6	0.456	15.88	2.87%

Notes: Refer to Table G-39

Table 5.1-93
CUMULATIVE 24-HOUR MAXIMUM IMPACTS FROM PM_{10}

Source	1995	1996	1997	1998	1999
SSU6 Project	2.0	2.6	2.2	2.1	2.6
Mineral Recovery Facility	1.0	1.3	1.3	1.4	1.3
Combined	2.1	2.6	2.2	2.2	2.6

Table 5.1-94
CUMULATIVE ANNUAL IMPACTS FROM PM_{10}

Source	1995	1996	1997	1998	1999
SSU6 Project	0.3	0.3	0.3	0.3	0.3
Mineral Recovery Facility	0.2	0.2	0.2	0.3	0.3
Combined	0.3	0.3	0.3	0.4	0.4

Notes: Refer to Table G-40 in Appendix G.2.

Table 5.1-95
LAWS, ORDINANCES, REGULATIONS, STANDARDS (LORS), AND PERMITS FOR PROTECTION OF AIR QUALITY

LORS	Purpose	Regulating Agency	Permit or Approval	AFC Section	Schedule and Status of Permit
Federal					
40 Code of Federal Regulations (CFR) Parts 50, 51 & 52 (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources.	APCD, with EPA Region IX oversight	After project review, issues with conditions limiting emissions.	Section 5.1	Agency approval to be obtained before start of construction.
State					
California Code of Regulations (CCR) Title 17, Division 3, Subchapter 1.5 (Air Basins and Air Quality Standards)	These regulations establish the California Ambient Air Quality Standard and their status in each air basin. Imperial County is in the Salton Sea Air Basin.	APCD, with CARB oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2	Agency approval to be obtained before start of construction.
CCR Title 17, Division 3, Subchapter 7 (Toxic Air Contaminants)	Regulates toxic air contaminants.	APCD, with CARB oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2	Agency approval to be obtained before start of construction.
CCR Title 17, Division 3, Subchapter 7.6 (Emission Inventory Criteria and Guidelines)	These regulations establish emission inventory criteria and guidelines	APCD, with CARB oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2	Agency approval to be obtained before start of construction.
CCR Title 20, Chapter 5 (Site Certification)	These regulations establish procedures for certifying power projects.	CEC		Section 5.1	
CCR Title 14, Section 15000 (CEQA)	These regulations establish procedures for evaluating projects	CEC		Section 5.1	
Local					
APCD Rule 109 (Source Sampling)	This rule outlines the facilities required for source sampling.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 111 (Equipment Breakdown)	This rule details the requirement necessary in an equipment breakdown situation.	APCD, with CARB oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of operation

Table 5.1-95 (continued)
LAWS, ORDINANCES, REGULATIONS, STANDARDS (LORS), AND PERMITS FOR PROTECTION OF AIR QUALITY

LORS	Purpose	Regulating Agency	Permit or Approval	AFC Section	Schedule and Status of Permit
APCD Rule 201 (Permits Required)	This rule specifies the requirement for an authority to construct and permit to operate.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 309 (Air Toxics "Hot Spots" Information and Assessment)	This rule requires testing of toxic air pollutants.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 207 (New & Modified Stationary Source Review)	This rule outlines the emission standards, the offset requirements and conditions, the need to meet ambient air quality standards, procedures for power plants under the CEC process, method of emission calculations, and the required air quality analysis.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 400 (Fuel Burning Equipment – Oxides of Nitrogen)	This rule applies to emission of nitrogen oxides from fuel burning equipment	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 401 (Opacity of Emissions)	This rule applies to opacity discharges from any single source.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 403 (General Limitations on the Discharge of Air Contaminants)	This rule applies to emissions of particulate mater from any single unit.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 405 (Sulfur Compounds Emissions Standards, Limitations and Prohibitions)	This rule applies to emissions of sulfur compounds from any single source of emissions.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 407 (Nuisances)	This rule applies to emissions of contaminants that could cause a nuisance to the public.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.
APCD Rule 800 (Fugitive Dust Requirement for Control of Fine Particulate Matter PM-10)	This rule applies to activities that may generate emissions of fugitive dust.	APCD, with CARB and EPA Region IX oversight	After project review, issues operating permit with conditions limiting emissions.	Section 5.1.5.2.3	Agency approval to be obtained before start of construction.

Table 5.1-96
BACT THRESHOLDS

Pollutant or Precursor	BACT Threshold (lbs/day)
Nonattainment pollutant (PM_{10}, ROC, NO_2)	25
Carbon monoxide (attainment areas only)	550
Lead	3.3
Asbestos	0.04
Beryllium	0.0022
Mercury	0.55
Vinyl chloride	5.5
Fluorides	16
Sulfuric acid mist	38
Hydrogen sulfide	55
Total reduced sulfur compounds	55

ROC = Reactive organic compound